2012 - JCR Evaluation Form

SPECIES: Bighorn Sheep
PERIOD: 6/1/2012 - 5/31/2013

HERD: BS201 - CLARKS FORK

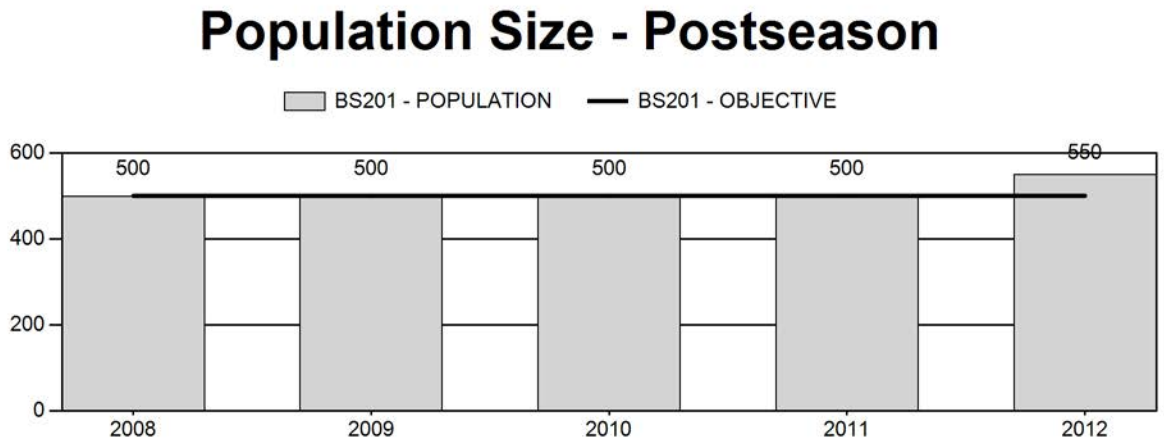
HUNT AREAS: 1
PREPARED BY: DOUG MCWHIRTER

	2007 - 2011 Average	2012	2013 Proposed
Population:	500	550	550
Harvest:	12	15	13
Hunters:	20	20	20
Hunter Success:	60%	75%	65%
Active Licenses:	20	20	20
Active License Percent:	60%	75%	65%
Recreation Days:	246	254	225
Days Per Animal:	20.5	16.9	17.3
Males per 100 Females	21	0	
Juveniles per 100 Females	29	0	

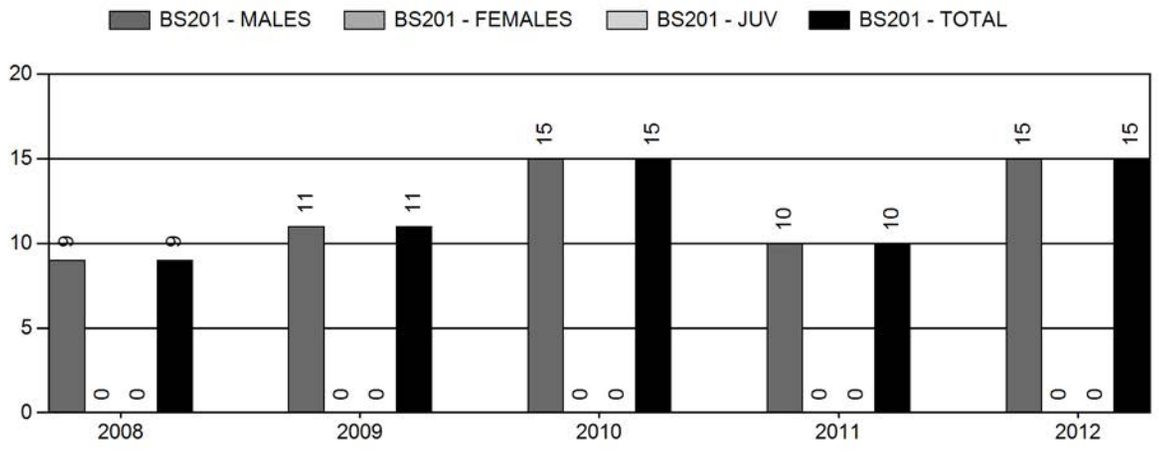
Population Objective:	500
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	10%
Number of years population has been + or - objective in recent trend:	3
Model Date:	2/26/2013

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

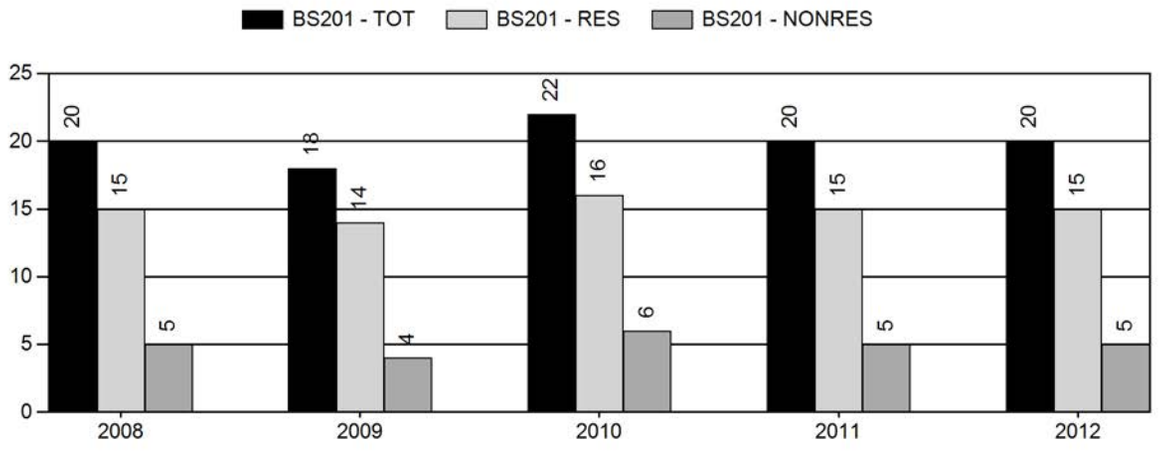
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	n/a%	11.0%
Juveniles (< 1 year old):	0%	0%
Total:	n/a%	0.2%
Proposed change in post-season population:	n/a%	3.6%



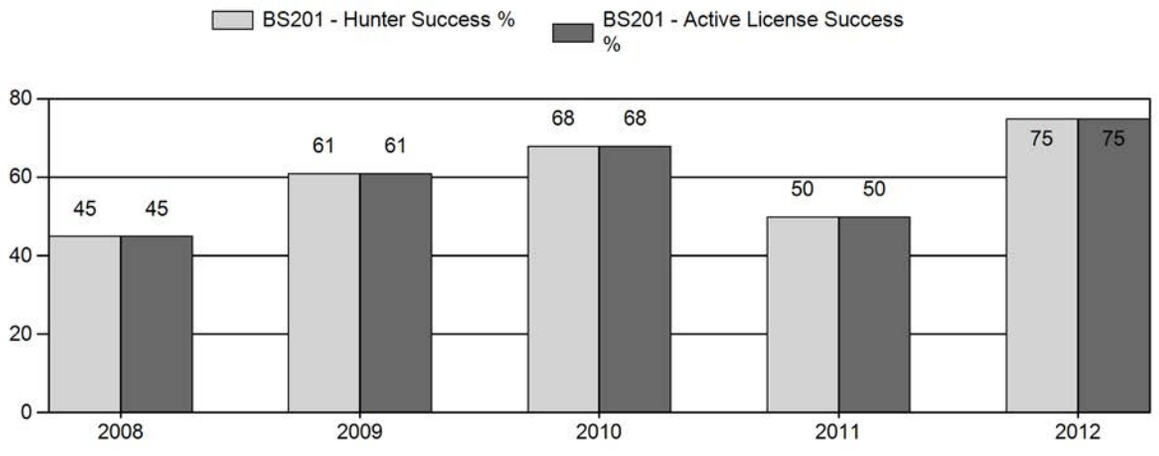
Harvest



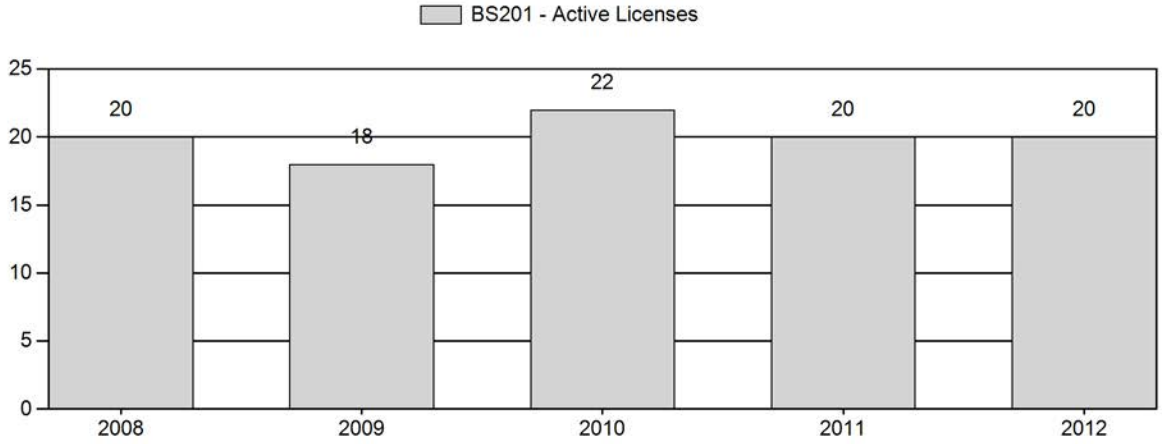
Number of Hunters



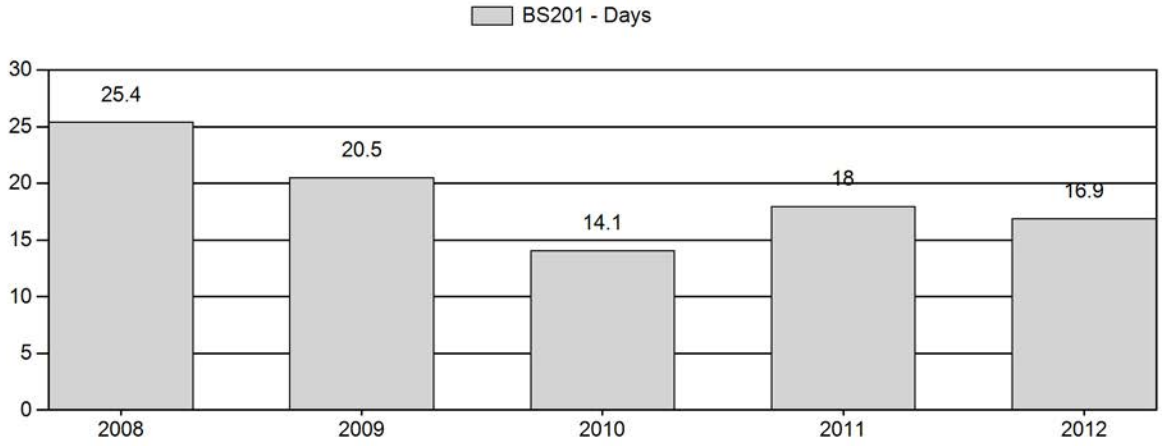
Harvest Success



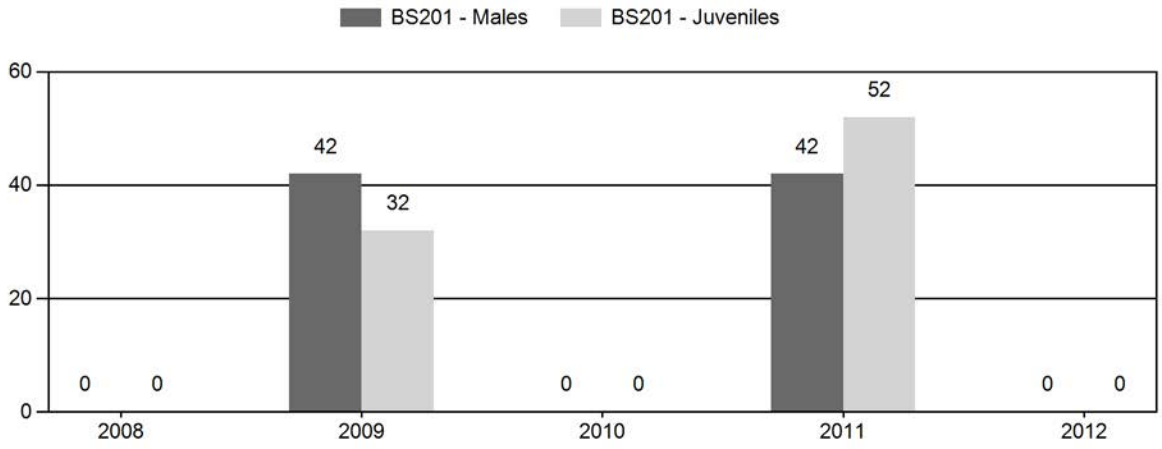
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2007 - 2012 Preseason Classification Summary

for Bighorn Sheep Herd BS201 - CLARKS FORK

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	525	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2008	525	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2009	525	5	94	99	24%	235	57%	75	18%	409	327	2	40	42	± 0	32	± 0	22
2010	525	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2011	525	0	85	85	22%	201	52%	104	27%	390	339	0	42	42	± 0	52	± 0	36
2012	558	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0

2013 HUNTING SEASONS
CLARKS FORK BIGHORN SHEEP HERD (BS201)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	Limitations
1	1	Sept. 1	Oct. 31	20	Limited quota; any ram
Archery		Aug. 15	Aug. 31		Refer to Section 4 of this Chapter

Hunt Area	Type	Quota change from 2012
		No Change
Total		**No Change**

Management Evaluation

Current Postseason Population Management Objective: 500
2012 Postseason Population Estimate: ~550
2013 Proposed Postseason Population Estimate: ~550

Herd Unit Issues. Most sheep in this herd unit are found in the Absaroka Mountains, although a small number (currently less than 50) occupy the Beartooth Mountains year-round. Some Absaroka Mountain sheep from the northern portion of the herd unit migrate into Montana, where they are subjected to hunting seasons there (currently an unlimited season with a harvest quota of 2). These sheep often end up wintering in the Wyoming portion of the Beartooth Mountains. In addition, perhaps 10%-15% of the sheep in this herd unit reside (some seasonally, some year-round) in Yellowstone National Park (YNP). Both of these factors (Montana harvest and sheep unavailable for harvest in YNP) are taken into account when managing this herd. Periodic fixed-wing trend counts (and more recently helicopter classification/trend surveys) during summer have been used to assess population performance. Summer surveys are done because many sheep migrate into Montana to winter, and surveys were designed to more closely monitor sheep while on Wyoming summer ranges. Classifications collected mid-summer are useful in tracking ram:ewe ratios, but allow little understanding of lamb survival as they are conducted so early in the year.

Weather. Weather conditions during the 2012 biological year were conducive to bighorn sheep reproduction and survival throughout the Absaroka Mountains, with below normal snow water equivalents (a reflection of winter severity), but normal to near normal precipitation to promote forage growth.

Habitat. No habitat monitoring data is collected in this herd unit. Unless spring snow accumulations increase dramatically (as they did in several areas of the Absaroka Mountains in spring 2011), survival and lamb production should be good in 2013.

Field Data. Classification samples from recent surveys reflect good lamb:ewe (51:100 – 65:100) and ram:ewe (42:100 – 56:100) ratios in most years surveyed (6 surveys over the last 10 years). Poor lamb:ewe ratios as seen in 2009 (32:100) do occasionally occur and can affect ram recruitment. Recent trend counts (401 sheep in 2006, 409 in 2009, 390 in 2011) also provide support that this herd is probably near the objective of 500 sheep.

Harvest Data. In 2012, 20 hunters took 15 rams for a success rate of 75.0%, which is among the better years seen since permits were increased to 20 in 2007. The average age of rams killed in 2012 was 7.4 years old, with 40.0% of the rams killed being 8 years old and older. No rams less than ¾ curl were killed in 2012. Although the harvest quota in Montana Hun District 502 is only 2 rams, 4 rams were taken in 2012.

Population. The "Time Specific Juvenile – Constant Adult Mortality Rate" (TSJCA) spreadsheet model was chosen to use for the post season population estimate of this herd. Although this model did not have the lowest relative AIC, the population estimate appears to be the most reasonable. The earlier trend projected by the model (early 1990s – early 2000s) is not felt to be entirely accurate, but estimates in the recent past appear reasonable. The postseason 2012 population is estimated to be approximately 550 sheep. Efforts will continue to improve this model and improve reliability.

Management Summary. All indicators show good population performance, and an acceptable presence of mature rams. Therefore license numbers will remain at 20 for the 2013 season. This should result in a postseason 2013 population of approximately 550 sheep.

Harvest parameters for the Clarks Fork Bighorn Sheep Herd Unit, 1968-2012 (Wyoming portion only).

	1968-72	1973-91	1992-97	1998-2002	2003-2006*	2007-2011*	2012*
Permits	20	24	20	16	16	20	20
Harvest	7.4	11.9	10.7	10.6	14.3	12.2	15
% Success	49.0%	53.5%	52.9%	67.7%	90.3%	61.0%	75.0%
Effort (days/ram)	6.8	16.7	17.7	16.7	10.3	20.4	16.9
Avg. Age	-	6.6	6.9	7.0	6.4	6.8	7.4
% Rams ≥ 8 Yrs	-	31.7%	26.7%	32.0%	21.1%	29.1%	40.0%
% Rams ≤ ¾ Curl	-	-	-	-	15.9%	7.8%	0%

* "any ram" regulation in place

INPUT	
Species:	Bighorn Sheep
Biologist:	Doug McWhirter
Herd Unit & No.:	Clarks Fork
Model date:	07/19/12

☐ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	62	71	☐ CJ,CA Model	
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	1480	1489	☐ SCJ,SCA Mod	
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	43	171	☑ TSJ,CA Model	

Population Estimates from Top Model

Year	Predicted Prehunt Population (year *i*)			Total	Predicted Posthunt Population (year *i*)			Total	Predicted adult End-of-bio-year Pop (year *i*)			LT Population Estimate		Trend Count	Objective
	Juveniles	Total Males	Females		Juveniles	Total Males	Females		Total Males	Females	Total Adults	Field Est	Field SE		
1993	37	42	111	**191**	37	32	111	**181**	37	113	**151**				
1994	57	37	111	**205**	57	23	111	**192**	39	123	**162**				
1995	51	38	121	**210**	51	26	121	**198**	39	130	**170**				
1996	54	39	127	**220**	54	25	127	**207**	34	132	**166**				
1997	61	34	129	**224**	61	23	129	**213**	33	135	**168**				
1998	66	32	132	**231**	66	22	132	**221**	34	139	**173**				
1999	66	33	136	**236**	66	21	136	**224**	33	143	**176**				
2000	68	32	140	**240**	68	22	140	**230**	34	147	**181**				
2001	87	34	144	**265**	87	23	144	**254**	47	163	**211**				
2002	81	46	160	**288**	81	31	160	**272**	53	177	**230**				
2003	113	52	173	**338**	113	35	173	**321**	66	199	**265**				
2004	105	65	195	**364**	105	49	195	**349**	78	217	**295**				
2005	124	76	213	**413**	124	63	213	**400**	97	240	**337**				
2006	119	95	235	**449**	119	79	235	**433**	102	252	**354**				
2007	138	100	247	**485**	138	83	247	**468**	105	263	**368**				
2008	144	103	257	**504**	144	93	257	**494**	117	273	**391**				
2009	86	115	268	**468**	86	103	268	**456**	121	278	**399**				
2010	138	118	273	**529**	138	102	273	**512**	123	287	**410**				
2011	145	121	281	**547**	145	110	281	**536**	128	296	**424**				
2012	143	125	291	**558**	143	109	291	**542**	133	305	**438**				
2013	147	131	299	**576**	147	116	299	**562**							
2014															
2015															
2016															
2017															
2018															
2019															
2020															
2021															
2022															
2023															
2024															
2025															

Survival and Initial Population Estimates

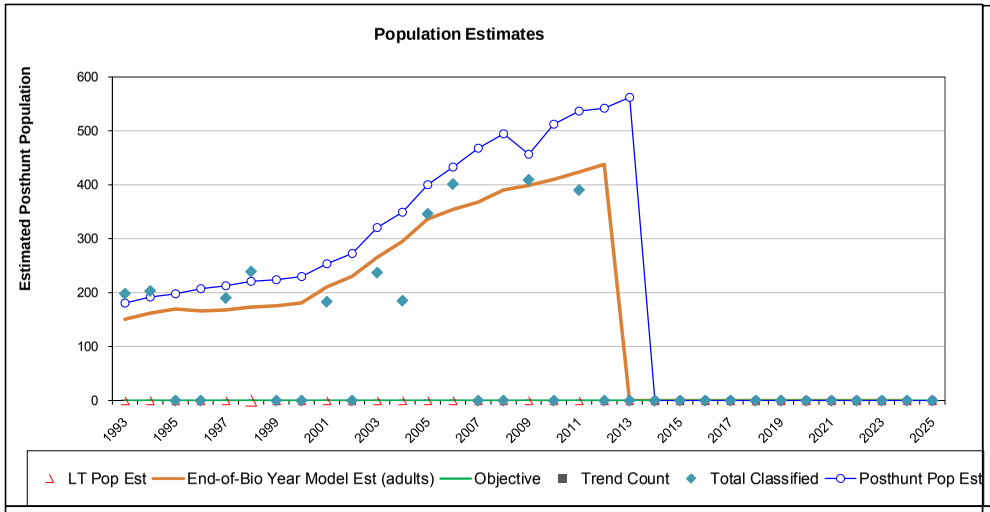
Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.40			0.93		
1994	0.60			0.93		
1995	0.60			0.93		
1996	0.40			0.93		
1997	0.40			0.93		
1998	0.40			0.93		
1999	0.40			0.93		
2000	0.40			0.93		
2001	0.60			0.93		
2002	0.60			0.93		
2003	0.60			0.93		
2004	0.60			0.93		
2005	0.60			0.93		
2006	0.48			0.93		
2007	0.40			0.93		
2008	0.40			0.93		
2009	0.55			0.93		
2010	0.40			0.93		
2011	0.40			0.93		
2012	0.40			0.93		
2013	0.00			0.93		
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						

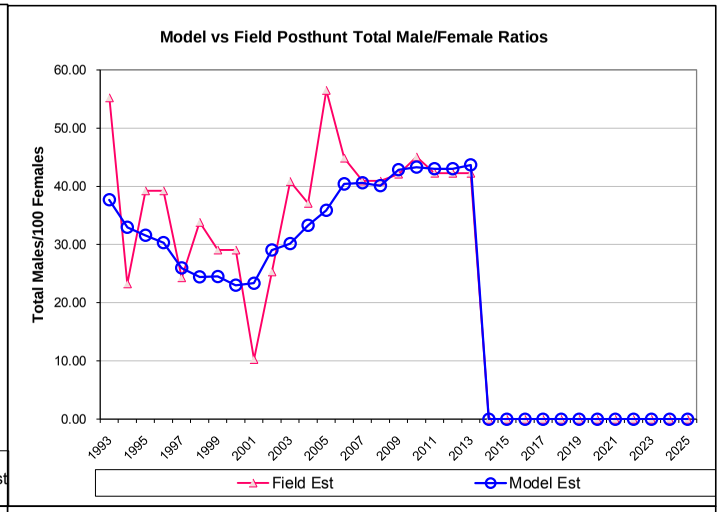
Parameters:	Optim cells
Adult Survival =	0.930
Initial Total Male Pop/10,000 =	0.004
Initial Female Pop/10,000 =	0.011

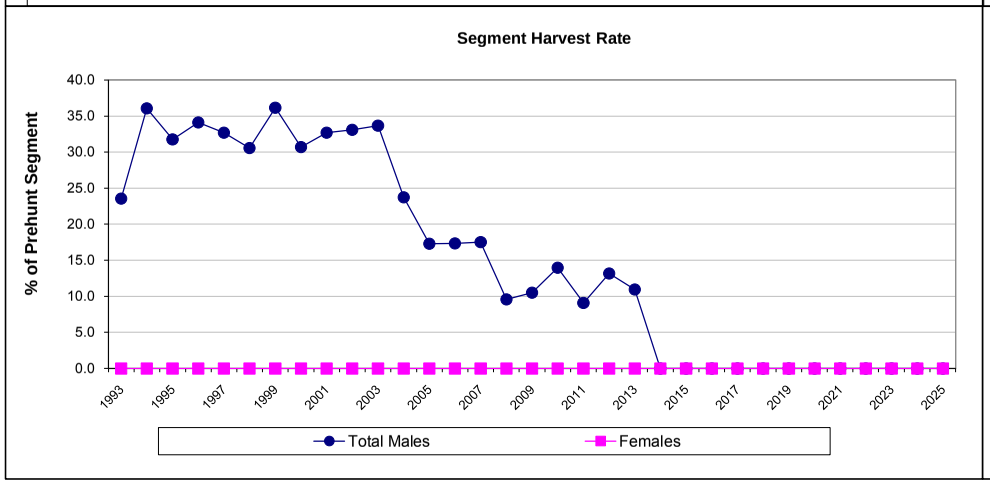
MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%
Over-summer adult survival	98%

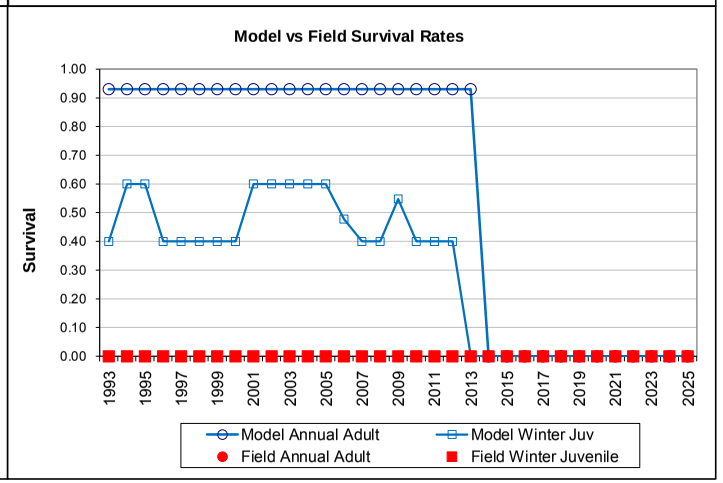
	Classification Counts						Harvest					
Year	Juvenile/Female Ratio			Total Male/Female Ratio							Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females
1993		33.33	6.51	37.70	55.24	9.04	9	0	0	9	23.6	0.0
1994		51.72	8.23	32.95	23.28	4.97	12	0	0	12	36.1	0.0
1995		42.53	7.37	31.59	39.26	7.01	11	0	0	11	31.8	0.0
1996		42.53	7.37	30.35	39.26	7.01	12	0	0	12	34.1	0.0
1997		46.85	7.87	25.98	24.32	5.22	10	0	0	10	32.7	0.0
1998		50.00	7.60	24.45	33.85	5.90	9	0	0	9	30.6	0.0
1999		48.42	7.73	24.52	29.09	5.56	11	0	0	11	36.2	0.0
2000		48.42	7.73	23.00	29.09	5.56	9	0	0	9	30.7	0.0
2001		60.75	9.55	23.38	10.28	3.26	10	0	0	10	32.7	0.0
2002		50.89	8.10	29.06	25.33	5.10	14	0	0	14	33.1	0.0
2003		65.22	9.68	30.17	40.87	7.08	16	0	0	16	33.7	0.0
2004		53.61	9.21	33.28	37.11	7.24	14	0	0	14	23.7	0.0
2005		58.39	7.58	35.88	56.52	7.41	12	0	0	12	17.3	0.0
2006		50.73	6.11	40.42	44.88	5.63	15	0	0	15	17.4	0.0
2007		55.77	8.14	40.61	40.94	6.49	16	0	0	16	17.5	0.0
2008		55.77	8.14	40.13	40.94	6.49	9	0	0	9	9.6	0.0
2009		31.91	4.23	42.85	42.13	5.05	11	0	0	11	10.5	0.0
2010		50.51	6.84	43.32	45.08	6.21	15	0	0	15	14.0	0.0
2011		51.74	6.25	43.01	42.29	5.47	10	0	0	10	9.1	0.0
2012		49.14	6.72	43.03	42.28	5.94			0	15	13.2	0.0
2013		49.14	6.72	43.69	42.28	5.94			0	13	11.0	0.0
2014												
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												

FIGURES



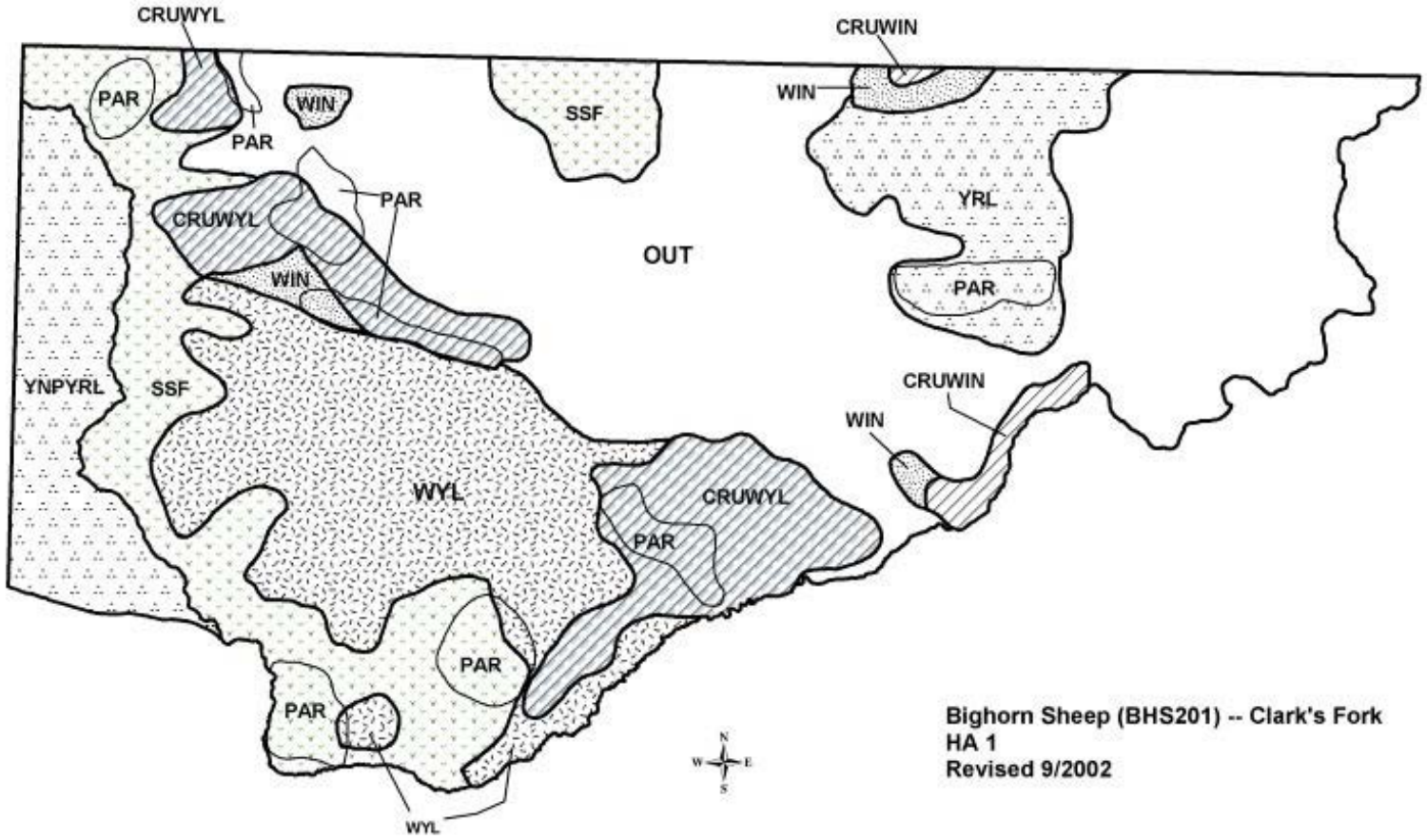






Comments:

END


CRUWYL
CRUWIN
PAR
WIN
PAR
SSF
WIN
PAR
CRUWYL
OUT
YRL
WIN
PAR
YNPYRL
SSF
CRUWIN
WIN
WYL
CRUWYL
PAR
PAR
PAR
WYL
N
W
E
S
Bighorn Sheep (BHS201) -- Clark's Fork
HA 1
Revised 9/2002

2012 - JCR Evaluation Form

SPECIES: Bighorn Sheep

PERIOD: 6/1/2012 - 5/31/2013

HERD: BS202 - TROUT PEAK

HUNT AREAS: 2

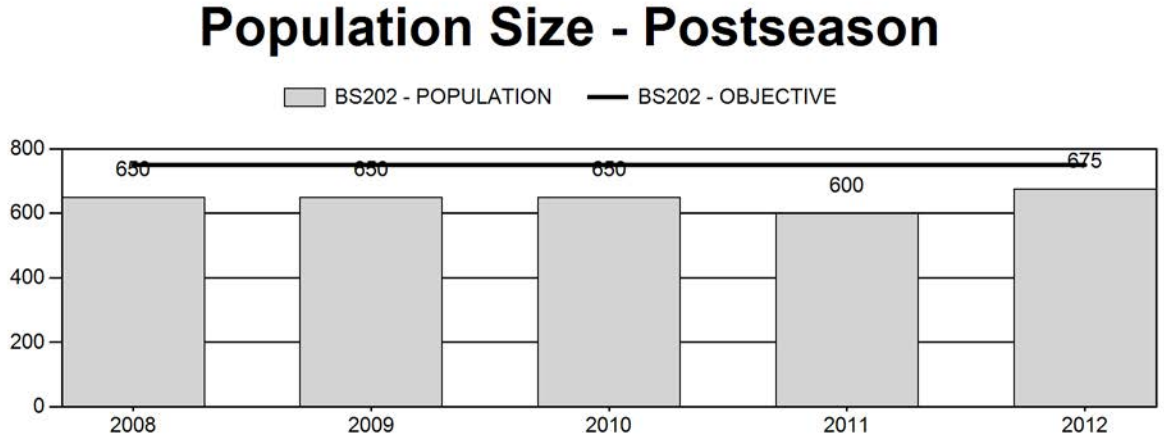
PREPARED BY: DOUG MCWHIRTER

	2007 - 2011 Average	2012	2013 Proposed
Population:	650	675	650
Harvest:	17	20	18
Hunters:	23	24	24
Hunter Success:	74%	83%	75%
Active Licenses:	23	24	24
Active License Percent:	74%	83%	75%
Recreation Days:	244	235	225
Days Per Animal:	14.4	11.8	12.5
Males per 100 Females	40	0	
Juveniles per 100 Females	27	0	

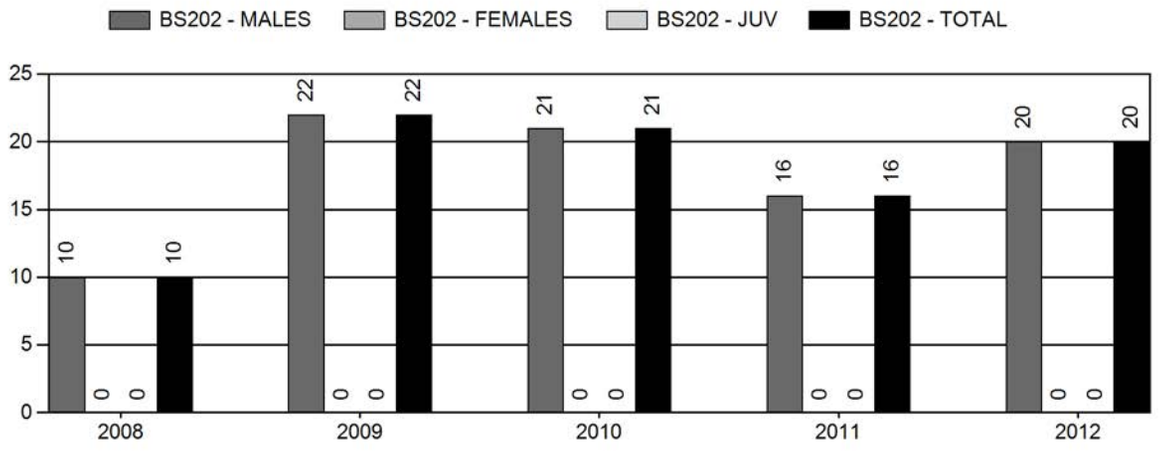
Population Objective:	750
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-10%
Number of years population has been + or - objective in recent trend:	10
Model Date:	2/26/2013

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

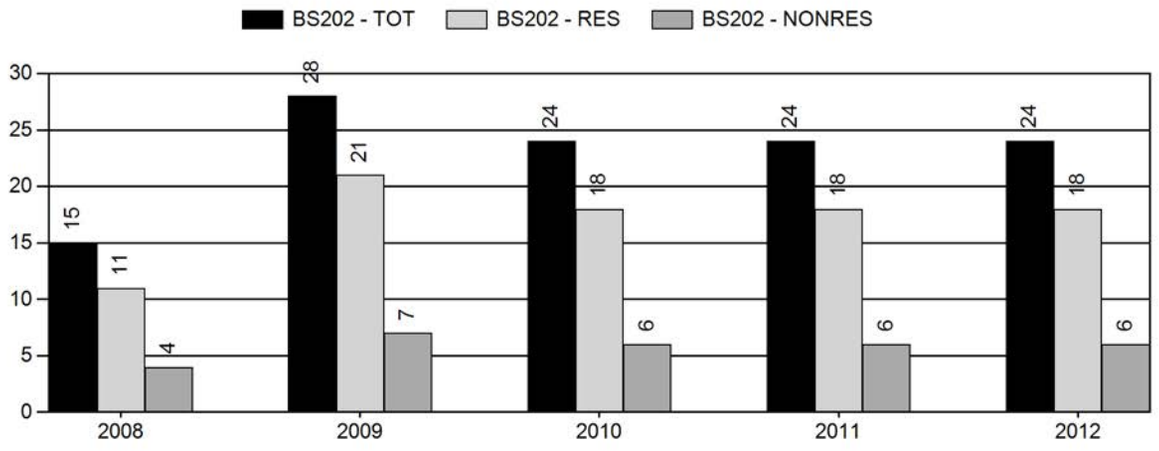
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	9.4%	11.6%
Juveniles (< 1 year old):	0%	0%
Total:	2.94%	2.7%
Proposed change in post-season population:	-2.4%	-2.7%



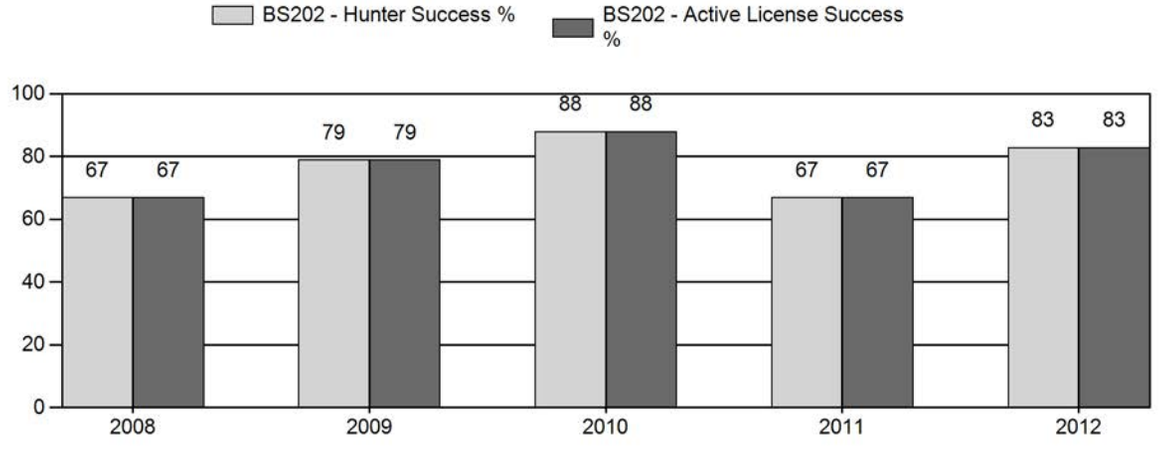
Harvest



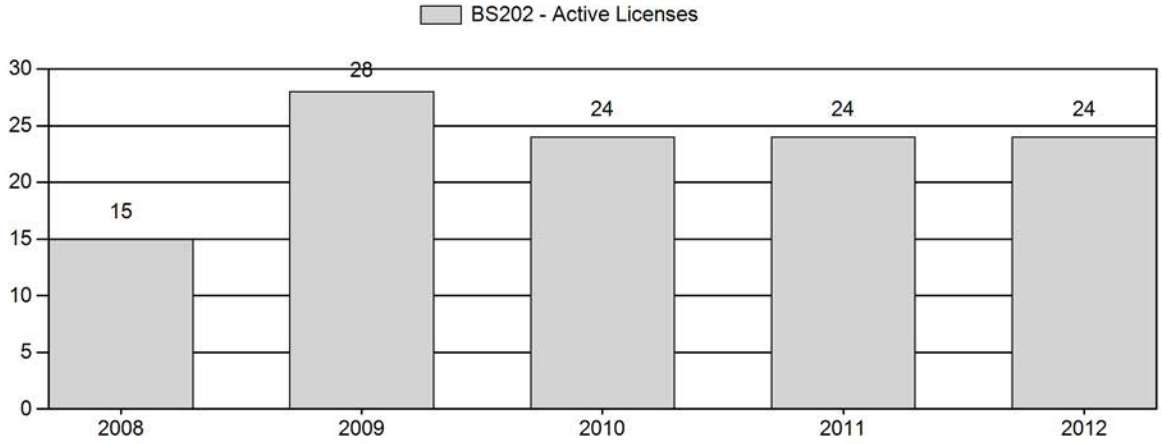
Number of Hunters



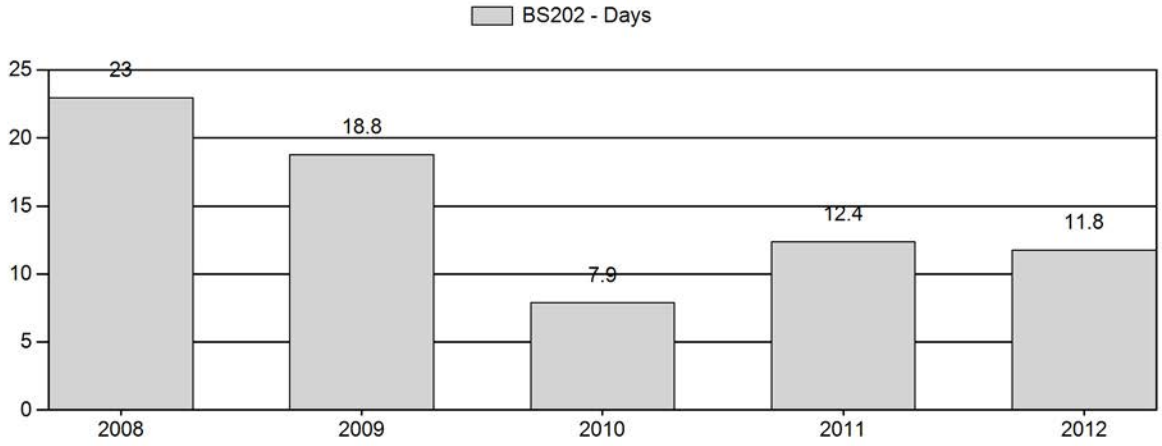
Harvest Success



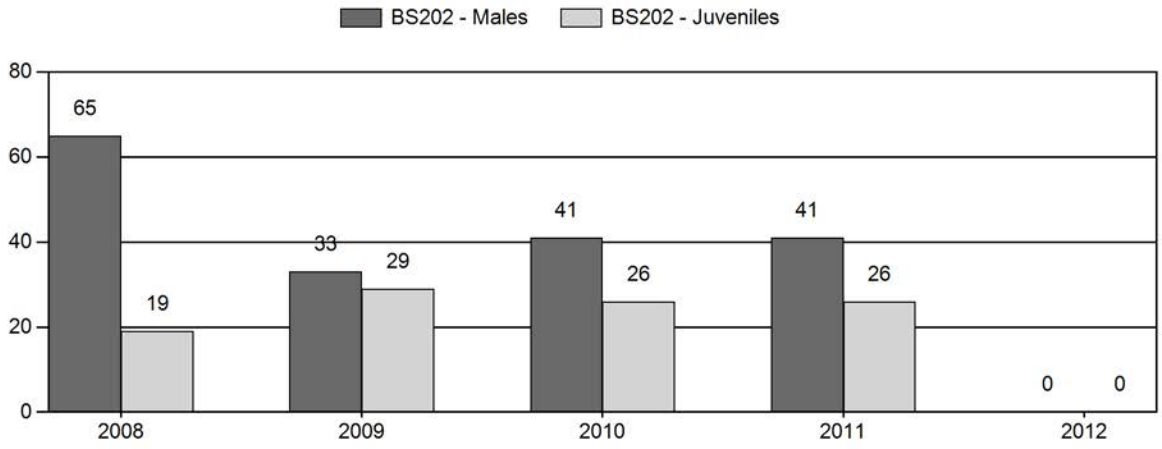
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2007 - 2012 Postseason Classification Summary

for Bighorn Sheep Herd BS202 - TROUT PEAK

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	700	15	76	91	19%	299	62%	90	19%	480	243	5	25	30	± 2	30	± 2	23
2008	650	8	94	102	35%	158	54%	30	10%	290	313	5	59	65	± 7	19	± 3	12
2009	650	9	54	63	20%	192	62%	55	18%	310	311	5	28	33	± 4	29	± 4	22
2010	650	0	111	111	24%	273	60%	71	16%	455	0	0	41	41	± 3	26	± 2	18
2011	600	1	110	111	24%	273	60%	71	16%	455	338	0	40	41	± 3	26	± 2	18
2012	675	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0

2013 HUNTING SEASONS
TROUT PEAK BIGHORN SHEEP HERD (BS202)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	Limitations
2	1	Sept. 1	Oct. 31	25	Limited quota; any ram (18 residents, 7 non-residents)
Archery		Aug. 15	Aug. 31		Refer to Section 4 of this Chapter

Hunt Area	Type	Quota change from 2012
2		No Change
Total		**No Change**

Management Evaluation

Current Postseason Population Management Objective: 750
2012 Postseason Population Estimate: ~675
2013 Proposed Postseason Population Estimate: ~650

Herd Unit Issues. The Trout Peak Herd Unit possesses some of the most difficult terrain in Wyoming, which is partially responsible for the wide variation in hunter statistics for which this herd is famous. A small percentage of sheep (presumably less than 10%) reside within Yellowstone National Park. Sheep can be found on low elevation winter ranges along the North Fork of the Shoshone River, but also occupy high elevation ranges throughout the hunt area.

Weather. Weather conditions during the 2012 biological year were conducive to bighorn sheep reproduction and survival throughout the Absaroka Mountains, with below normal snow water equivalents (a reflection of winter severity), but normal to near normal precipitation to promote forage growth.

Habitat. No habitat monitoring data is collected in this herd unit. Unless spring snow accumulations increase dramatically (as they did in several areas of the Absaroka Mountains in spring 2011), survival and lamb production should be good in 2013.

Field Data. Seven surveys have been conducted over the last 10 years, resulted in samples ranging from 117 to 480 classified sheep. Lamb:ewe ratios have ranged from 15:100 to 31:100 over this time, while ram:ewe ratios have varied from 30:100 to 67:100. The most recent survey in 2011 resulted in 465 sheep observed, representing one of the higher sample sizes obtained, even though the western portion of the hunt area was not surveyed. The lamb:ewe ratio for this sample was 26:100, which is slightly below the recent average. The ram:ewe ratio was 41:100 which is about average.

Harvest Data. In 2012, 24 hunters took 20 rams for a success rate of 83%, which is among the better years experienced by this herd unit. The average age of rams killed in 2012 was 8.6 years old, with 68.4% of the rams killed being 8 years old and older, which was not predicted, but is not entirely surprising as this herd has traditionally exhibited large fluctuations in harvest statistics, primarily a result of it being the most difficult terrain in which to hunt sheep in Wyoming. One ram less than ¾ curl was killed in 2012.

All of these indicators, plus good lamb:ewe and ram:ewe ratios from recent surveys, indicate good population performance, and an acceptable presence of mature rams.

Population . The "Time Specific Juvenile – Constant Adult Mortality Rate" (TSJCA) spreadsheet model was chosen to use for the post season population estimate of this herd. Although this model did not have the lowest relative AIC, the population estimate and trend appears to be very reasonable. The postseason 2012 population is estimated to be 675 sheep. Efforts will continue to improve this model and improve reliability.

Management Summary. Since adopting the any ram regulation in 2004, this herd unit has exhibited some of the variation in harvest parameters for which it has always been famous. When averaged over the last 8 years, however, harvest parameters are within desirable ranges. Therefore permit levels will be set at 24 licenses for the 2013 season (25 with the additional nonresident hunter needed to attain a statewide 75:25 split between residents and nonresidents). The postseason 2013 population is estimated to be approximately 650 sheep.

Harvest parameters for the Trout Peak Bighorn Sheep Herd, 1978-2012.

	1978-96	1997-2002	2003	2004-2011*	2012*
Permits	32	24	28	24+	24
Harvest	18.8	15.2	16	18.3	20
% Success	61.0%	63.8%	61.5%	76.8%	83%
Effort (days/ram)	18.2	16.0	25.1	13.6	11.8
Avg. Age	5.9	6.7	6.6	6.8	8.6
% Rams ≥ 8 Yrs	19.5%	25.6%	18.8%	25.4%	68.4%
% Rams ≤ ¾ Curl	-	-	-	4.8%	5.3%

*any ram regulation in place

+ 25 permits were issued in 2006, 2007, and 15and 28 permits were issued in 2008 and 2009, respectively due to the Gunbarrel Fire

INPUT	
Species:	Bighorn Sheep
Biologist:	Doug McWhirter
Herd Unit & No.:	Trout Peak
Model date:	02/26/13

☑ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	48	57	☐ CJ,CA Model	
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	806	815	☐ SCJ,SCA Mod	
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	42	157	☑ TSJ,CA Model	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population			Total	Predicted Posthunt Population			Total	Objective
	Field Est	Field SE		Juveniles	Total Males	Females		Juveniles	Total Males	Females		
1994				95	123	268	485	95	101	268	463	750
1995				101	113	268	482	101	95	268	464	750
1996				77	109	270	455	77	90	270	436	750
1997				81	99	266	447	81	83	266	430	750
1998				82	93	264	439	82	75	264	421	750
1999				131	99	274	504	131	86	274	491	750
2000				122	126	301	548	122	110	301	533	750
2001				133	145	322	600	133	125	322	580	750
2002				83	163	346	593	83	145	346	575	750
2003				86	152	339	578	86	135	339	560	750
2004				90	155	346	591	90	133	346	569	750
2005				107	145	342	594	107	126	342	576	750
2006				149	155	356	660	149	130	356	634	750
2007				109	150	361	620	109	132	361	601	750
2008				71	160	373	605	71	149	373	594	750
2009				107	164	372	642	107	140	372	618	750
2010				116	167	383	666	116	144	383	643	750
2011				103	174	397	675	103	157	397	657	750
2012				109	182	405	696	109	160	405	674	750
2013				107	171	399	676	107	151	399	656	750
2014												750
2015												750
2016												750
2017												750
2018												750
2019												750
2020												750
2021												750
2022												750
2023												750
2024												750
2025												750
2026												750

Survival and Initial Population Estimates

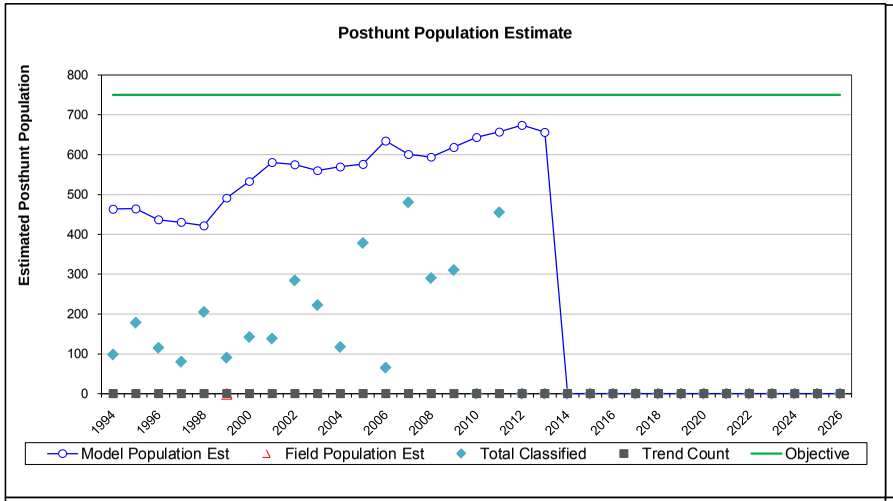
Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1994	0.40			0.93		
1995	0.40			0.93		
1996	0.40			0.93		
1997	0.40			0.93		
1998	0.70			0.93		
1999	0.70			0.93		
2000	0.70			0.93		
2001	0.70			0.93		
2002	0.41			0.93		
2003	0.70			0.93		
2004	0.46			0.93		
2005	0.70			0.93		
2006	0.40			0.93		
2007	0.70			0.93		
2008	0.70			0.93		
2009	0.70			0.93		
2010	0.70			0.93		
2011	0.70			0.93		
2012	0.40			0.93		
2013	0.70			0.93		
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						
2026						

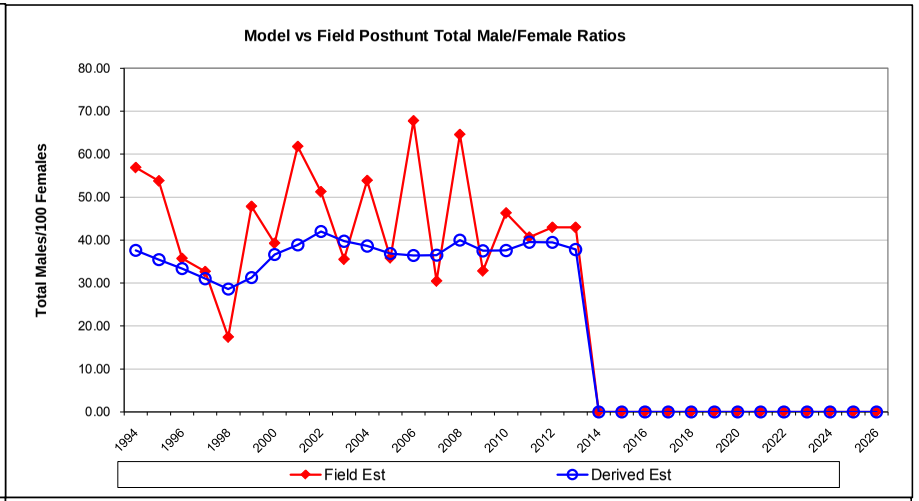
Parameters:	Optim cells
Adult Survival =	0.930
Initial Total Male Pop/10,000 =	0.010
Initial Female Pop/10,000 =	0.027

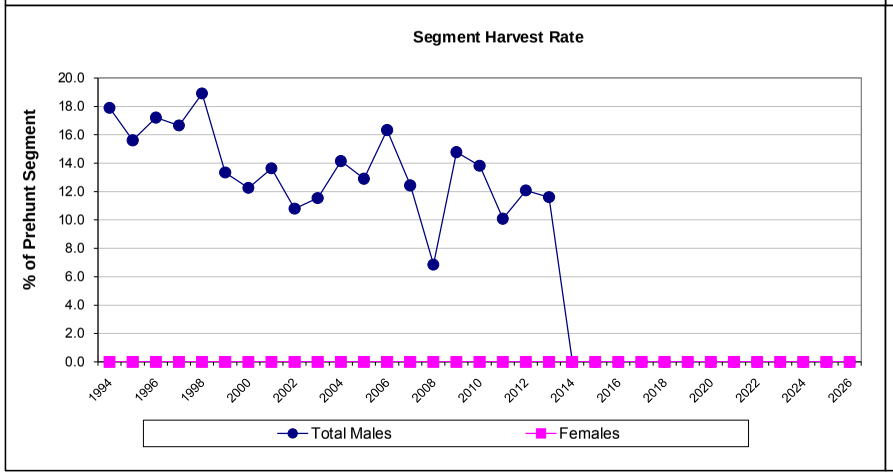
MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%

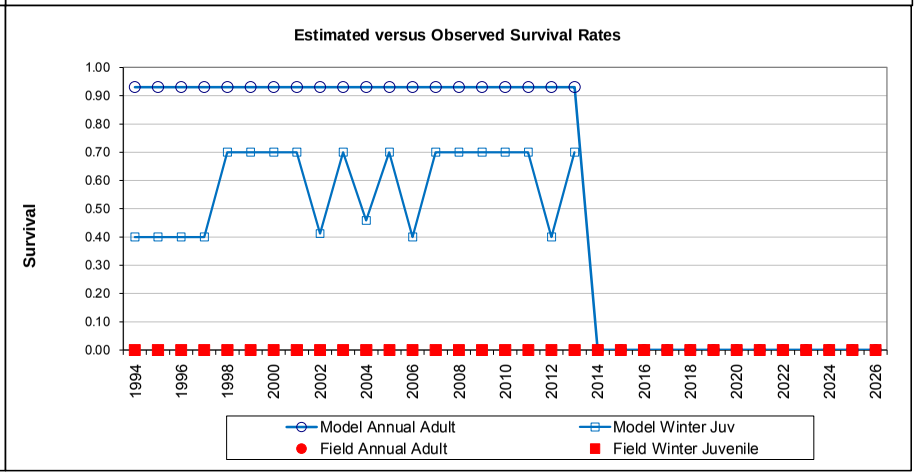
Year	Classification Counts: Juvenile/Female Ratio			Classification Counts: Total Male/Female Ratio			Harvest				Harvest: Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/o bull adj	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females
1994		35.29	9.68	37.64	56.86	13.22	0	20	0	20	17.9	0.0
1995		37.63	7.46	35.47	53.76	9.43	0	16	0	16	15.6	0.0
1996		28.57	7.24	33.37	35.71	8.32	0	17	0	17	17.2	0.0
1997		30.61	9.03	31.02	32.65	9.40	0	15	0	15	16.7	0.0
1998		31.16	5.44	28.61	17.39	3.85	0	16	0	16	18.9	0.0
1999		47.83	12.40	31.29	47.83	12.40	0	12	0	12	13.3	0.0
2000		40.51	8.49	36.65	39.24	8.32	0	14	0	14	12.3	0.0
2001		41.18	9.25	38.88	61.76	12.12	0	18	0	18	13.6	0.0
2002		24.07	4.29	42.00	51.23	6.92	0	16	0	16	10.8	0.0
2003		25.36	4.80	39.75	35.51	5.90	0	16	0	16	11.5	0.0
2004		26.15	7.12	38.63	53.85	11.29	0	20	0	20	14.2	0.0
2005		31.42	4.27	36.88	35.84	4.64	0	17	0	17	12.9	0.0
2006		41.94	13.86	36.44	67.74	19.15	0	23	0	23	16.3	0.0
2007		30.10	3.62	36.51	30.43	3.64	0	17	0	17	12.4	0.0
2008		18.99	3.78	40.03	64.56	8.20	0	10	0	10	6.9	0.0
2009		28.65	4.38	37.52	32.81	4.76	0	22	0	22	14.8	0.0
2010		30.22	5.98	37.58	46.28	8.08	0	21	0	21	13.8	0.0
2011		26.01	3.46	39.52	40.66	4.58	0	16	0	16	10.1	0.0
2012		26.79	4.25	39.48	42.95	5.85	0	20	0	20	12.1	0.0
2013		26.79	4.25	37.81	42.95	5.85	0	18	0	18	11.6	0.0
2014												
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												
2026												

FIGURES





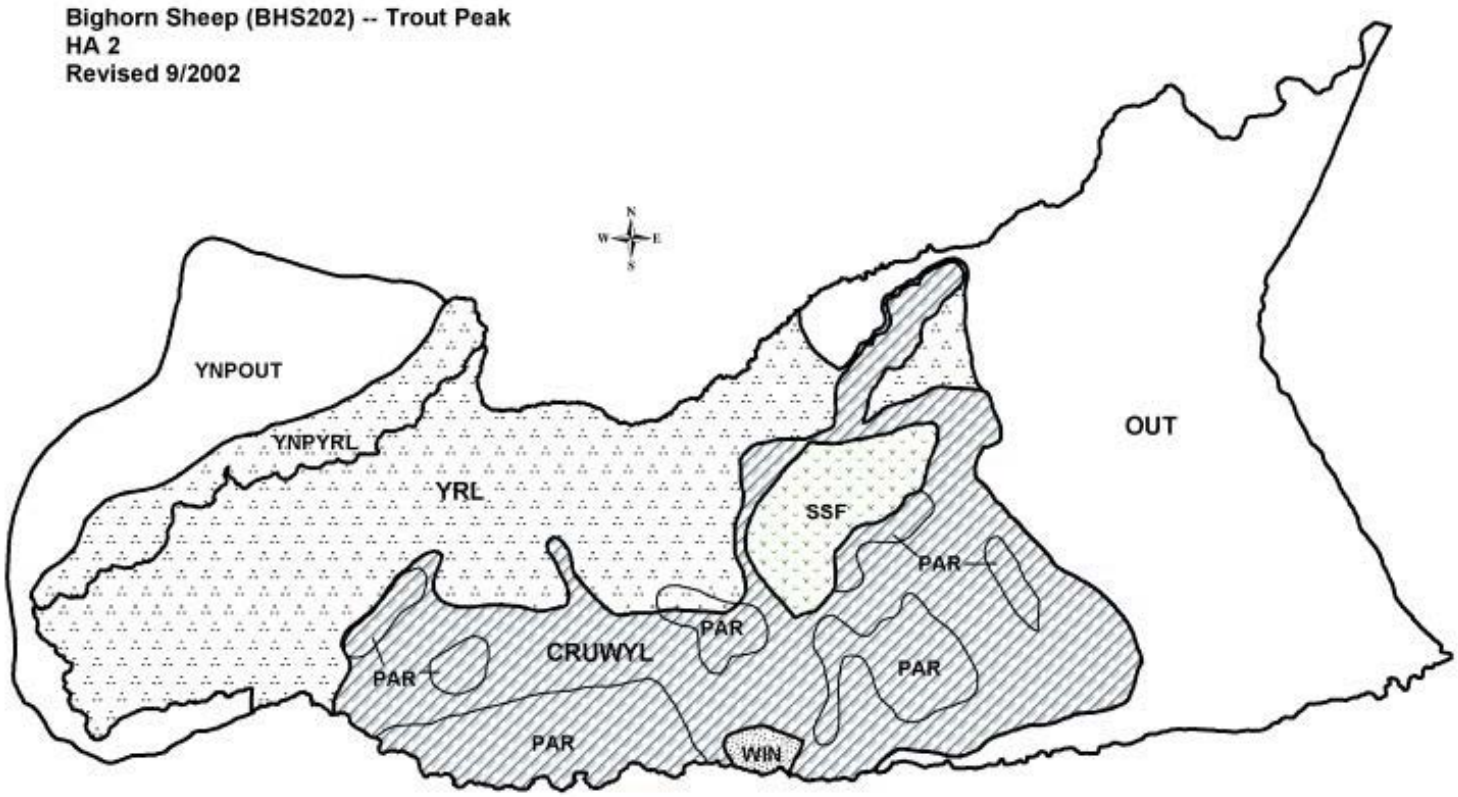




Comments:

END

Bighorn Sheep (BHS202) -- Trout Peak
HA 2
Revised 9/2002



2012 - JCR Evaluation Form

SPECIES: Bighorn Sheep

PERIOD: 6/1/2012 - 5/31/2013

HERD: BS203 - WAPITI RIDGE

HUNT AREAS: 3

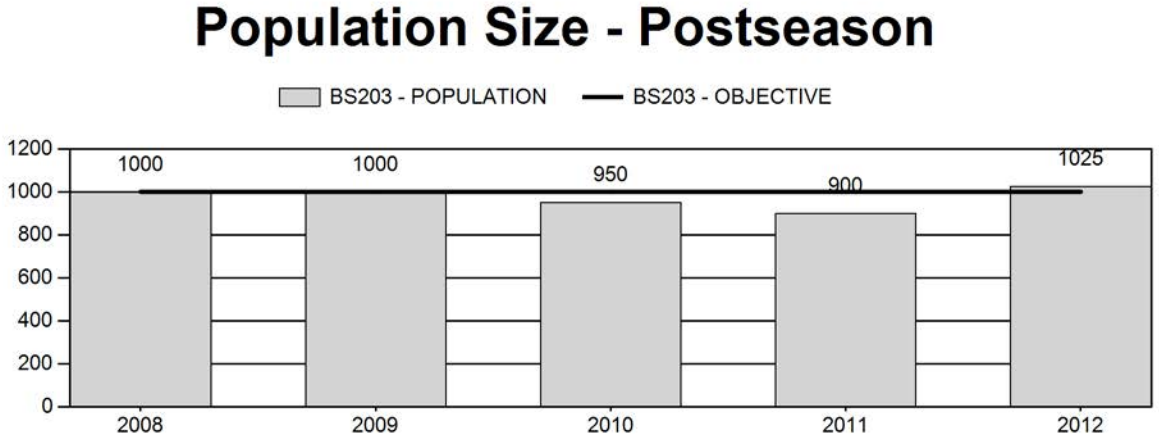
PREPARED BY: DOUG MCWHIRTER

	2007 - 2011 Average	2012	2013 Proposed
Population:	970	1,025	950
Harvest:	36	38	32
Hunters:	45	46	40
Hunter Success:	80%	83%	80%
Active Licenses:	45	46	40
Active License Percent:	80%	83%	80%
Recreation Days:	379	438	375
Days Per Animal:	10.5	11.5	11.7
Males per 100 Females	36	35	
Juveniles per 100 Females	26	37	

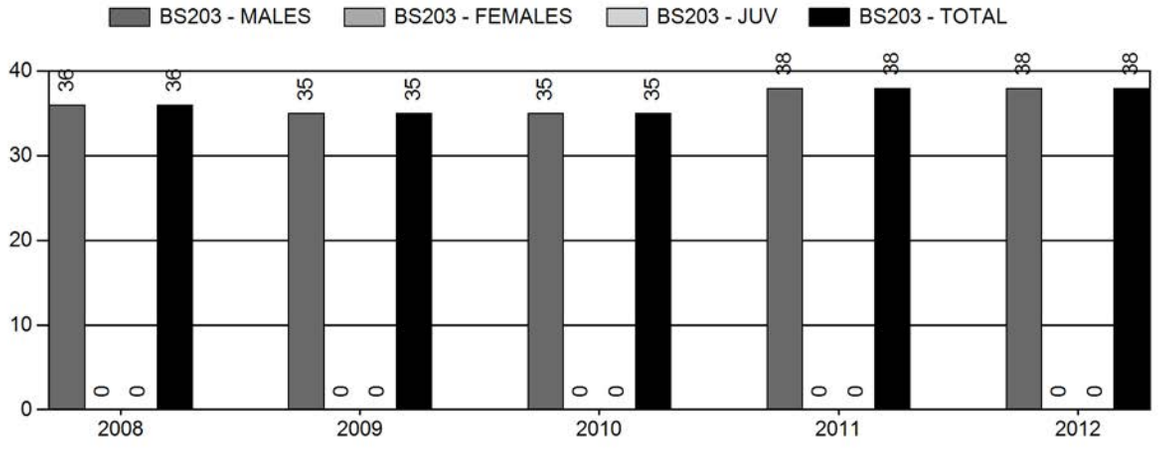
Population Objective:	1,000
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	2%
Number of years population has been + or - objective in recent trend:	1
Model Date:	2/26/2013

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

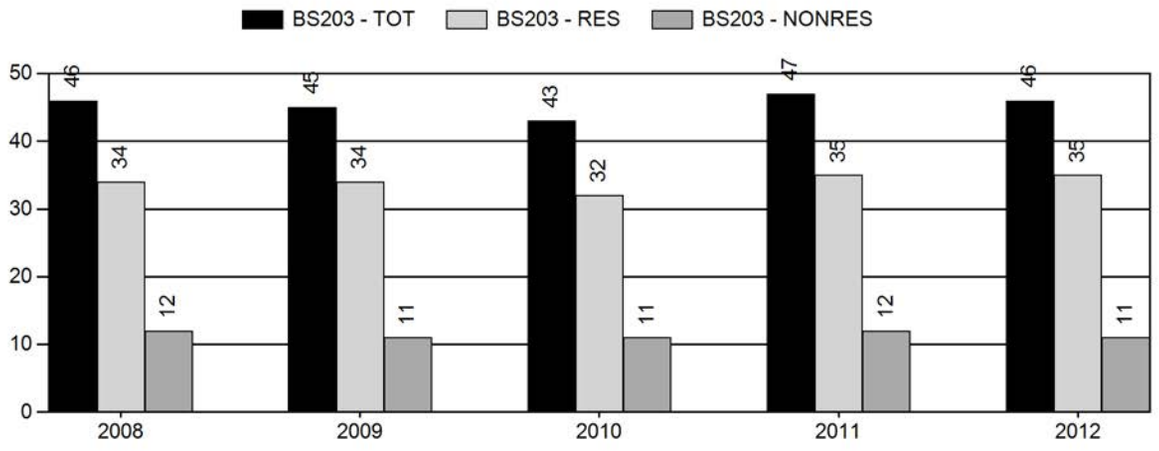
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	13.9%	15.6%
Juveniles (< 1 year old):	0%	0%
Total:	3.88%	3.2%
Proposed change in post-season population:	-4.8%	-6.0%



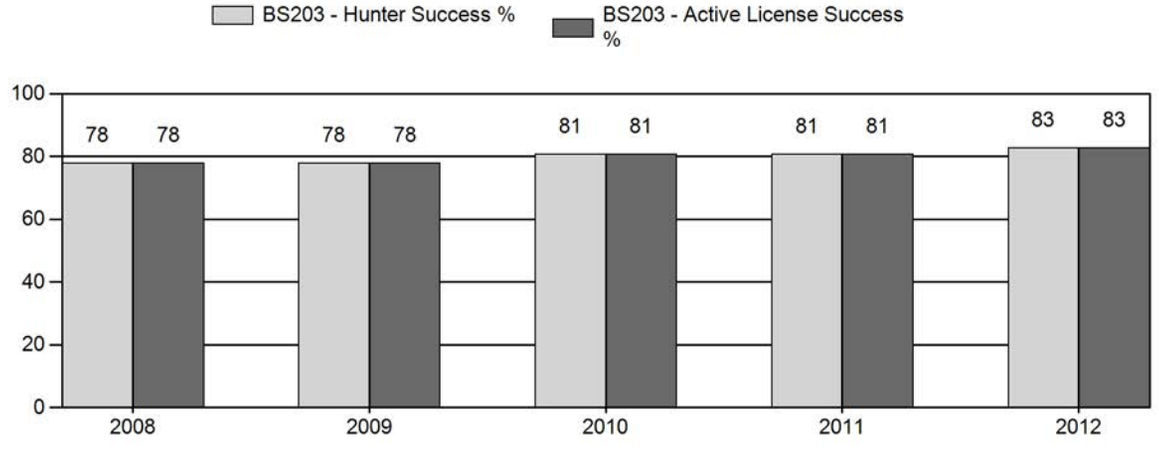
Harvest



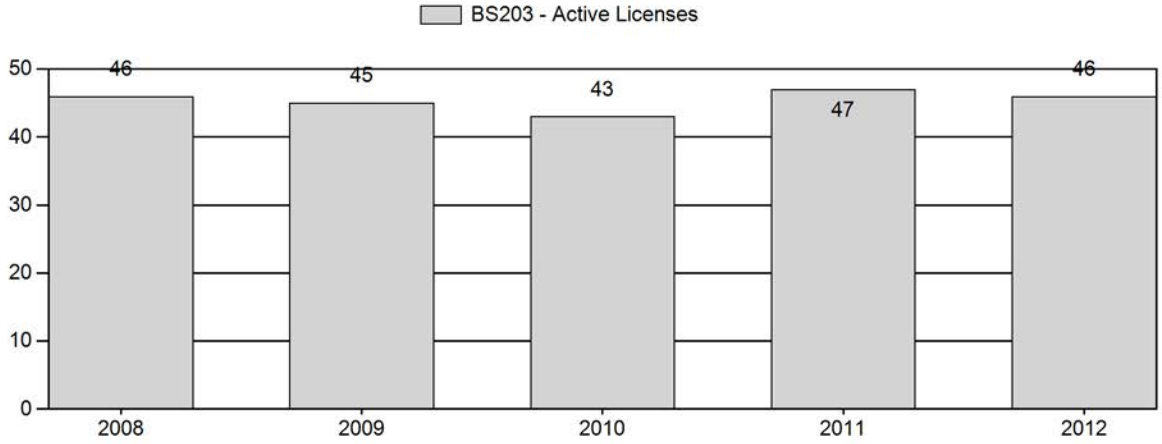
Number of Hunters



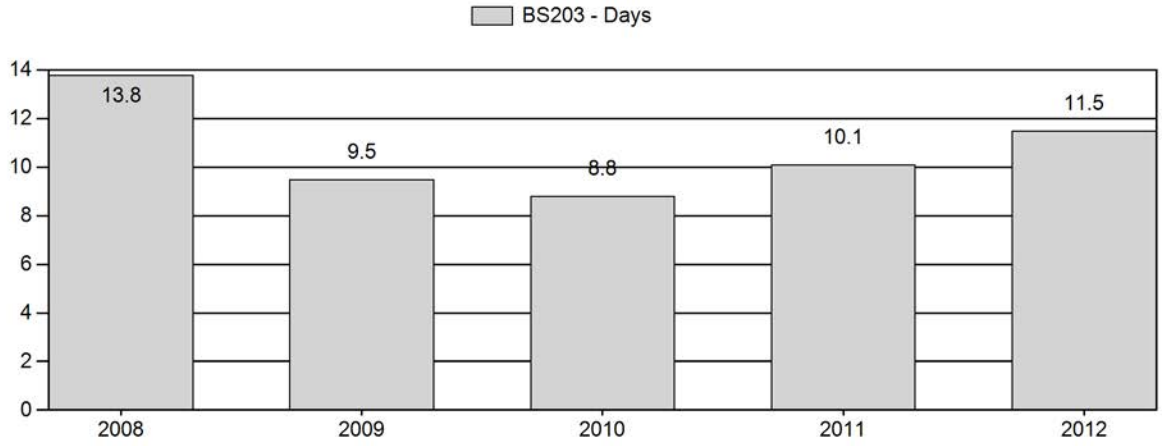
Harvest Success



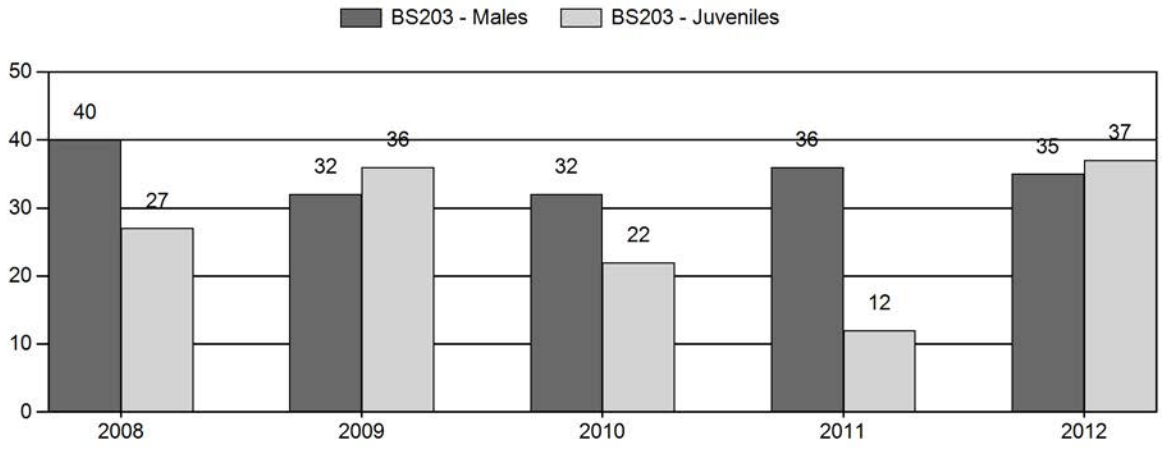
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2008 - 2012 Postseason Classification Summary

for Bighorn Sheep Herd BS203 - WAPITI RIDGE

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2008	1,000	25	154	179	24%	452	60%	120	16%	751	413	6	34	40	± 2	27	± 2	19
2009	1,000	49	126	175	19%	544	60%	195	21%	914	392	9	23	32	± 1	36	± 1	27
2010	950	8	33	41	21%	130	65%	28	14%	199	392	6	25	32	± 6	22	± 5	16
2011	900	12	148	160	24%	446	67%	55	8%	661	415	3	33	36	± 2	12	± 1	9
2012	1,025	7	32	39	20%	111	58%	41	21%	191	392	6	29	35	± 8	37	± 8	27

2013 HUNTING SEASONS
WAPITI RIDGE BIGHORN SHEEP HERD (BS203)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	Limitations
3	1	Sept. 1	Oct. 31	40	Limited quota; any ram
Archery		Aug. 15	Aug. 31		Refer to Section 4 of this Chapter

Hunt Area	Type	Quota change from 2012
3	1	-6
Total	**1**	**-6**

Management Evaluation

Current Postseason Population Management Objective: 1,000
2012 Postseason Population Estimate: ~1,025
2013 Proposed Postseason Population Estimate: ~950

Herd Unit Issues. The Wapiti Ridge Herd Unit consists of sheep that occupy low elevation winter ranges along the North and South Forks of the Shoshone River, but also occupy high elevation ranges throughout the hunt area. A small percentage of sheep (presumably less than 10%) reside within Yellowstone National Park.

Weather. Weather conditions during the 2012 biological year were conducive to bighorn sheep reproduction and survival throughout the Absaroka Mountains, with below normal snow water equivalents (a reflection of winter severity), but normal to near normal precipitation to promote forage growth.

Habitat. No habitat monitoring data is collected in this herd unit. Unless spring snow accumulations increase dramatically (as they did in several areas of the Absaroka Mountains in spring 2011), survival and lamb production should be good in 2013. This herd unit likely suffered impacts from the above normal snowfall received during the spring of 2011.

Field Data. Eight surveys have been conducted over the last 10 years, resulted in samples ranging from 315 to 914 classified sheep. Lamb:ewe ratios have ranged from 12:100 to 37:100 over this time, while ram:ewe ratios have varied from 32:100 to 46:100. The most recent survey in 2011 resulted in 661 sheep observed, a lamb:ewe ratio of 12:100 (which is well below the recent average), and a ram:ewe ratio of 36:100, which is about average for this herd unit.

Harvest Data. In 2012, 46 hunters took 38 rams for a success rate of 83%, which is about average for this herd unit. The average age of rams killed in 2012 was 6.8 years old, with 31.6% of the rams killed being 8 years old and older. Four rams less than ¾ curl were killed in 2012. Hunter effort was 11.5 days per ram harvested in 2012, which is higher (although not substantially) than most years. These figures represent a return to levels that triggered permit reductions in the early 2000s.

Population. The "Time Specific Juvenile – Constant Adult Mortality Rate" (TSJCA) spreadsheet model was chosen to use for the post season population estimate of this herd. Although this model did not have the lowest relative AIC, the population estimate appears to be reasonable. The rather steep decline produced by the model however, is not believed to entirely realistic. The postseason 2012 population is estimated to be 1,025 sheep. Efforts will continue to improve this model and improve reliability.

The effects of the very poor lamb crop of 2005 (17 lambs:110 ewes) was felt in 2012, and should continue to be felt again this year, as this cohort should be 8 year old rams in 2013. This may be offset somewhat by a much better lamb:ewe ratio in 2006 (37:100). However, another worrisome factor is the number of pickup heads registered in 2011 (n=21) and 2012 (n=24). These numbers represent an increase of 69% and 94% over the previous 10-year average number of pickup heads per year. The 2010-2011 winter obviously had impacts on this population, as evidenced by the lamb:ewe ratio of 12:100 seen in postseason 2011 surveys.

Management Summary. With the extremely poor lamb production experienced recently, it is likely that the availability of rams will decline in this herd unit in coming years as lambs from these cohorts enter mature ram age classes. Further permit reductions may be necessary in the near future to preserve or improve ram hunting opportunities. Harvest statistics should be monitored closely to determine if such a situation is developing. License numbers will be reduced to 40 for the 2013 season. The postseason 2013 population is estimated to be approximately 950 sheep.

Harvest parameters for the Wapiti Ridge Bighorn Sheep Herd Unit, 1978-2012.

	1978-83	1984-85	1986-92	1993-1999	2000-04*	2005-11*	2012*
Permits	32	36	40	44	48	44	46
Harvest	22.5	29.5	36.1	36.9	38.0	36.3	38
% Success	69.3%	81.2%	83.0%	79.0%	77.6%	81.2%	82.6%
Effort (days/ram)	11.3	9.3	8.6	9.0	9.8	10.1	11.5
Avg. Age	5.9	7.1	6.9	7.1	6.8	6.7	6.8
% Rams $\geq$ 8 Yrs	12.8%	49.2%	41.5%	35.1%	31.0%	28.9%	31.6%
% Rams $\leq$ ¾ Curl	-	-	-	-	8.4%	8.4%	10.5%

* "any ram" regulation in place

INPUT	
Species:	Bighorn Sheep
Biologist:	Doug McWhirter
Herd Unit & No.:	Wapiti Ridge
Model date:	02/26/13

☑ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	18	27	☐ CJ,CA Model	
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	6633	6642	☐ SCJ,SCA Mod	
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	9	124	☑ TSJ,CA Model	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population			Total	Predicted Posthunt Population			Total	Objective
	Field Est	Field SE		Juveniles	Total Males	Females		Juveniles	Total Males	Females		
1993				303	420	942	1665	303	380	942	1625	1000
1994				349	404	911	1663	349	362	911	1621	1000
1995				176	396	891	1463	176	358	891	1425	1000
1996				103	358	839	1300	103	317	839	1260	1000
1997				225	307	778	1310	225	264	778	1267	1000
1998				263	317	781	1361	263	277	781	1321	1000
1999				305	342	797	1444	305	302	797	1403	1000
2000				269	379	825	1474	269	336	825	1431	1000
2001				296	397	839	1533	296	357	839	1492	1000
2002				151	425	861	1437	151	384	861	1395	1000
2003				226	399	830	1454	226	358	830	1414	1000
2004				242	402	828	1471	242	359	828	1429	1000
2005				138	373	795	1305	138	334	795	1267	1000
2006				287	350	766	1402	287	308	766	1360	1000
2007				219	335	748	1302	219	294	748	1261	1000
2008				191	309	719	1219	191	270	719	1179	1000
2009				246	282	687	1215	246	243	687	1176	1000
2010				152	303	704	1158	152	265	704	1120	1000
2011				85	292	688	1065	85	250	688	1023	1000
2012				163	255	650	1069	163	214	650	1027	1000
2013				155	225	619	1000	155	190	619	965	1000
2014												
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												

Survival and Initial Population Estimates

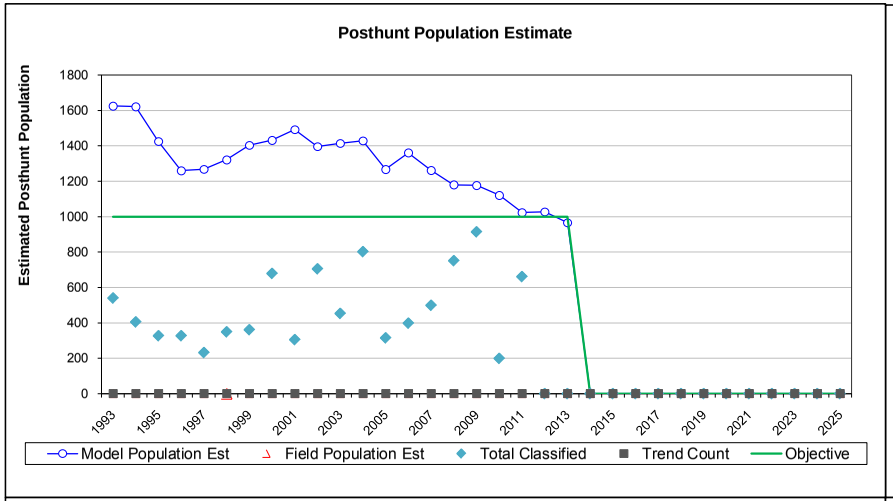
Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.40			0.90		
1994	0.40			0.90		
1995	0.40			0.90		
1996	0.40			0.90		
1997	0.70			0.90		
1998	0.70			0.90		
1999	0.70			0.90		
2000	0.70			0.90		
2001	0.70			0.90		
2002	0.70			0.90		
2003	0.70			0.90		
2004	0.40			0.90		
2005	0.70			0.90		
2006	0.40			0.90		
2007	0.40			0.90		
2008	0.40			0.90		
2009	0.68			0.90		
2010	0.70			0.90		
2011	0.70			0.90		
2012	0.40			0.90		
2013				0.90		
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						

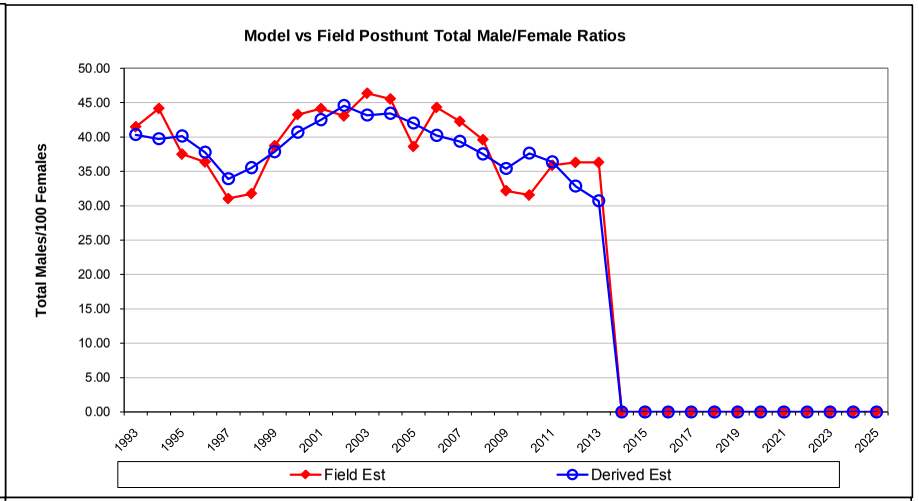
Parameters:	Optim cells
Adult Survival =	0.902
Initial Total Male Pop/10,000 =	0.038
Initial Female Pop/10,000 =	0.094

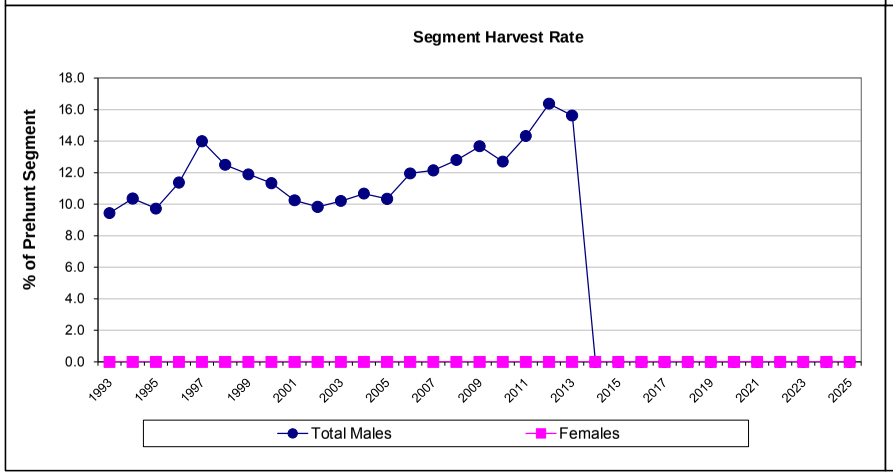
MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%

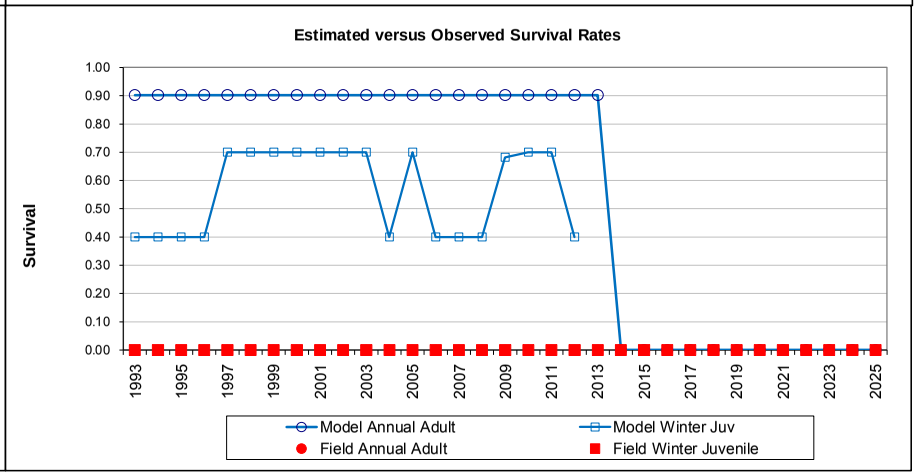
Year	Classification Counts: Juvenile/Female Ratio			Classification Counts: Total Male/Female Ratio			Harvest				Harvest: Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/o bull adj	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females
1993		32.15	3.70	40.35	41.48	4.34	0	36	0	36	9.4	0.0
1994		38.29	4.88	39.73	44.14	5.35	0	38	0	38	10.4	0.0
1995		19.71	3.37	40.13	37.50	4.98	0	35	0	35	9.7	0.0
1996		12.27	2.50	37.78	36.36	4.75	0	37	0	37	11.4	0.0
1997		28.97	5.08	33.92	31.03	5.30	0	39	0	39	14.0	0.0
1998		33.65	4.62	35.52	31.75	4.45	0	36	0	36	12.5	0.0
1999		38.24	5.09	37.86	38.73	5.13	0	37	0	37	11.9	0.0
2000		32.64	3.35	40.69	43.26	4.01	0	39	0	39	11.3	0.0
2001		35.29	5.30	42.50	44.12	6.12	0	37	0	37	10.2	0.0
2002		17.54	2.17	44.57	43.05	3.75	0	38	0	38	9.8	0.0
2003		27.20	3.64	43.19	46.36	5.10	0	37	0	37	10.2	0.0
2004		29.19	2.87	43.43	45.53	3.80	0	39	0	39	10.7	0.0
2005		17.33	3.17	42.03	38.61	5.15	0	35	0	35	10.3	0.0
2006		37.44	4.85	40.22	44.29	5.40	0	38	0	38	12.0	0.0
2007		29.21	3.60	39.36	42.27	4.55	0	37	0	37	12.1	0.0
2008		26.55	2.73	37.54	39.60	3.50	0	36	0	36	12.8	0.0
2009		35.85	2.99	35.40	32.17	2.80	0	35	0	35	13.7	0.0
2010		21.54	4.49	37.63	31.54	5.65	0	35	0	35	12.7	0.0
2011		12.33	1.76	36.36	35.87	3.31	0	38	0	38	14.3	0.0
2012		25.09	3.11	32.84	36.29	3.96	0	38	0	38	16.4	0.0
2013		25.09	3.11	30.70	36.29	3.96	0	32	0	32	15.6	0.0
2014												
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												

FIGURES



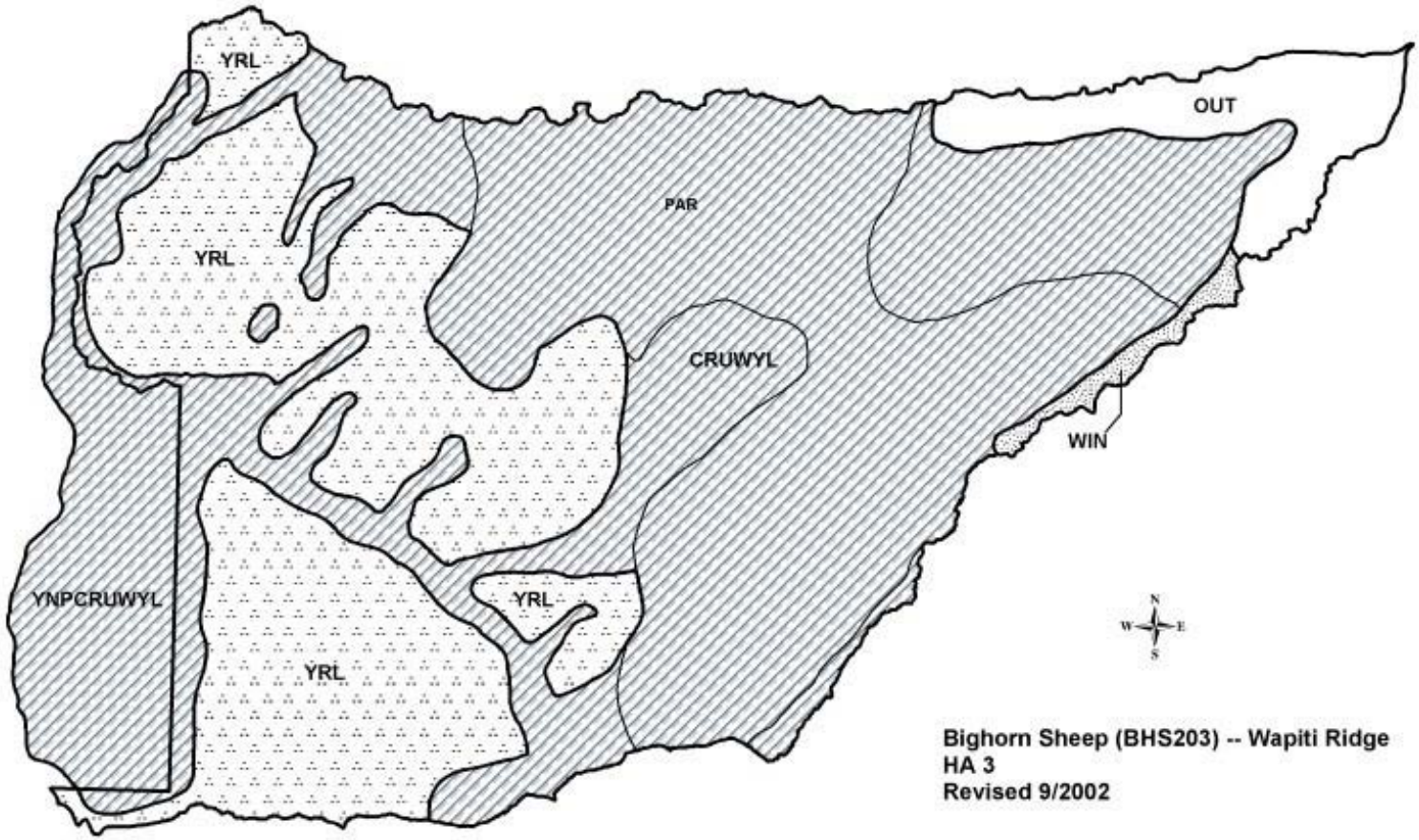






Comments:

END



Bighorn Sheep (BHS203) -- Wapiti Ridge
HA 3
Revised 9/2002

2012 - JCR Evaluation Form

SPECIES: Bighorn Sheep

PERIOD: 6/1/2012 - 5/31/2013

HERD: BS204 - YOUNTS PEAK

HUNT AREAS: 4

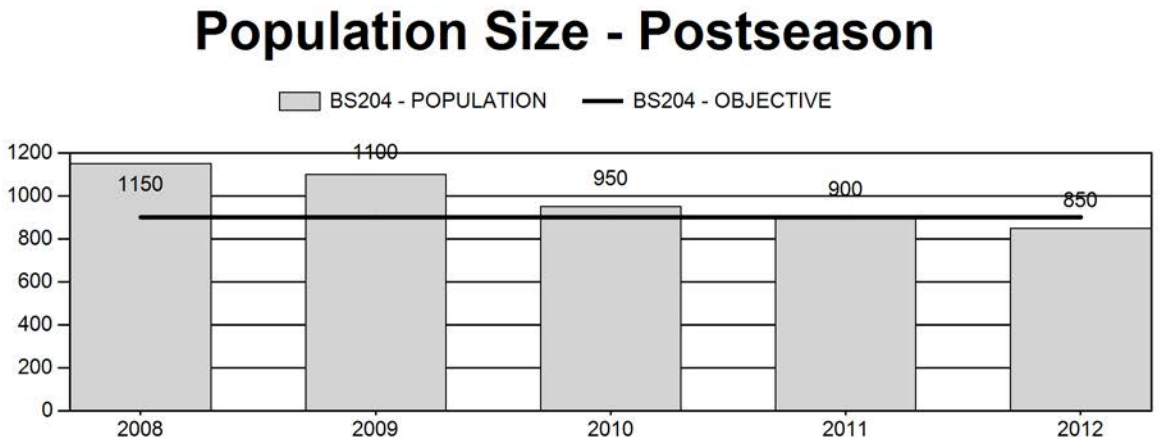
PREPARED BY: DOUG MCWHIRTER

	2007 - 2011 Average	2012	2013 Proposed
Population:	1,060	850	800
Harvest:	33	18	15
Hunters:	42	31	20
Hunter Success:	79%	58%	75%
Active Licenses:	42	31	20
Active License Percent:	79%	58%	75%
Recreation Days:	313	223	180
Days Per Animal:	9.5	12.4	12
Males per 100 Females	45	30	
Juveniles per 100 Females	20	21	

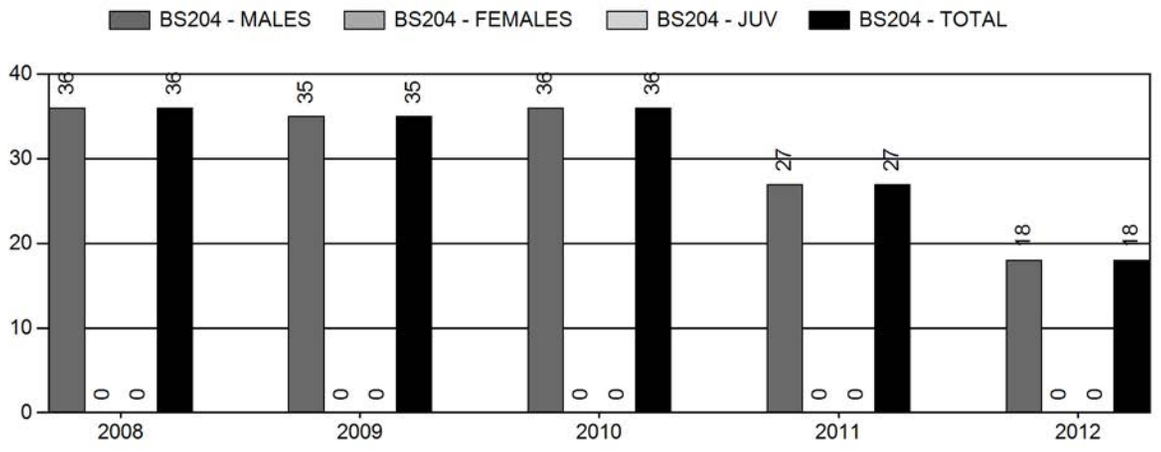
Population Objective:	900
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-5.6%
Number of years population has been + or - objective in recent trend:	2
Model Date:	4/10/2013

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

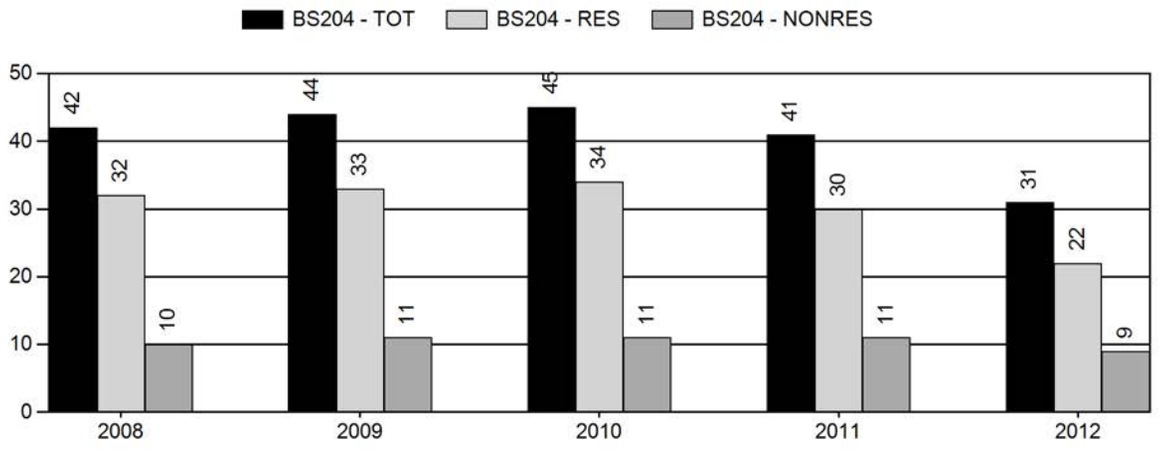
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	8.8%	8.0%
Juveniles (< 1 year old):	0%	0%
Total:	2.04%	1.83%
Proposed change in post-season population:	-5.6%	-5.8%



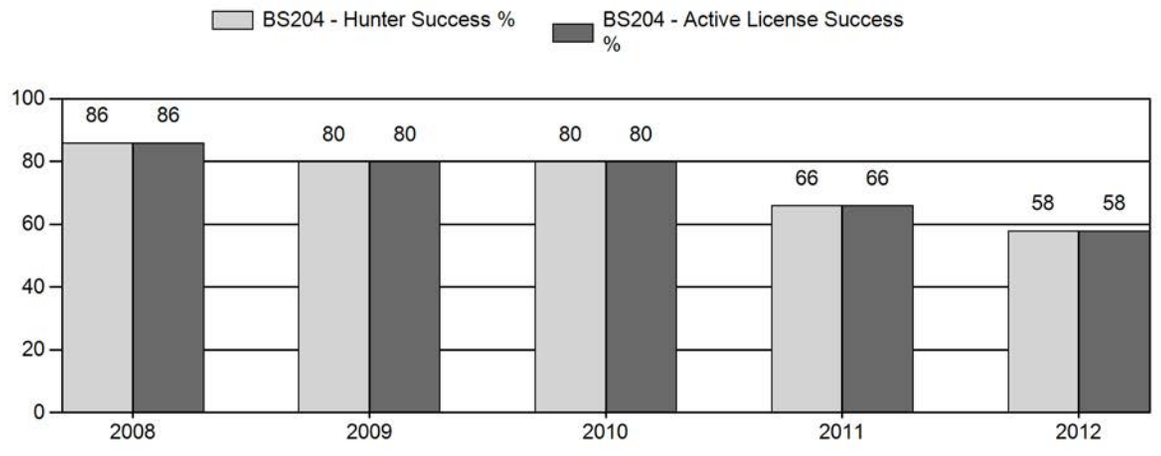
Harvest



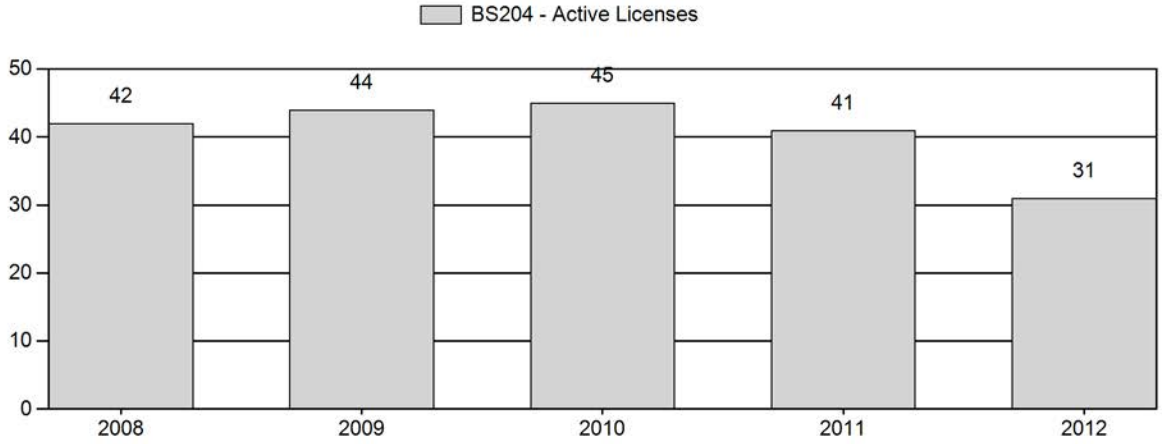
Number of Hunters



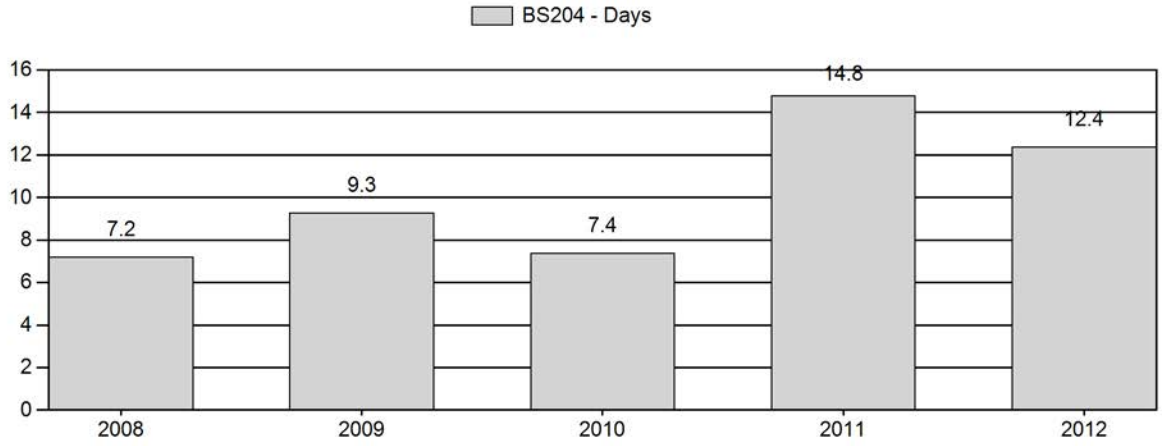
Harvest Success



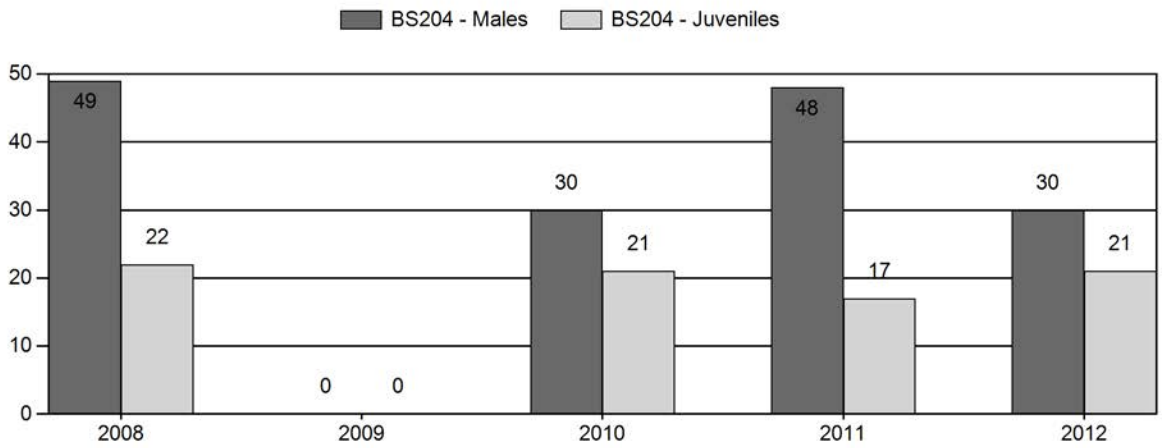
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2008 - 2012 Postseason Classification Summary

for Bighorn Sheep Herd BS204 - YOUNTS PEAK

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2008	1,150	3	149	152	29%	309	58%	69	13%	530	482	1	48	49	± 5	22	± 3	15
2009	1,100	0	0	0	0%	0	0%	0	0%	0	376	0	0	0	± 0	0	± 0	0
2010	950	0	46	46	20%	155	67%	32	14%	233	409	0	30	30	± 6	21	± 4	16
2011	900	21	126	147	29%	305	60%	53	10%	505	386	7	41	48	± 4	17	± 2	12
2012	850	0	46	46	20%	155	67%	32	14%	233	0	0	30	30	± 5	21	± 4	16

2013 HUNTING SEASONS
YOUNTS PEAK BIGHORN SHEEP HERD (BS204)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	Limitations
4	1	Sept. 1	Oct. 31	20	Limited quota; any ram
Archery		Aug. 15	Aug. 31		Refer to Section 4 of this Chapter

Hunt Area	Type	Quota change from 2012
4	1	-8
Total	**1**	**-8**

Management Evaluation

Current Postseason Population Management Objective: 900
2012 Postseason Population Estimate: ~850
2013 Proposed Postseason Population Estimate: ~800

Herd Unit Issues. The Younts Peak Herd Unit is characterized by sheep that live at extremely high elevation year-round. This subjects many of them to occasionally heavy winter losses, which occurred in 1995, 1996, and 2010. Anthropogenic factors have limited impacts on this population since most of the area is wilderness and access to this area is difficult. No human development (oil/gas, mining, housing) currently affect this population or their habitats.

Weather. Weather conditions during the 2012 biological year were conducive to bighorn sheep reproduction and survival throughout the Absaroka Mountains, with below normal snow water equivalents (a reflection of winter severity), but normal to near normal precipitation to promote forage growth.

Habitat. No habitat monitoring data is collected in this herd unit. Unless spring snow accumulations increase dramatically (as they did in this herd unit in spring 2011), survival and lamb production should be good in 2013.

Field Data. Five surveys have been conducted over the last 10 years, resulted in samples ranging from 233 to 567 classified sheep. Lamb:ewe ratios have ranged from 17:100 to 36:100 over this time, although 3 of these surveys produced lamb:ewe ratios of 17:100, 21:100, and 22:100. Ram:ewe ratios have varied from 30:100 to 54:100. The most recent survey in 2011 resulted in 505 sheep observed, a lamb:ewe ratio of 17:100 (which is well below the recent average), and a ram:ewe ratio of 48:100, which is slightly below average for this herd unit.

Harvest Data. In 2012, 31 hunters took 18 rams for a success rate of 58%, which is the lowest seen in this herd unit since 1995, when this herd last experienced heavy winter-related mortality. The average age of rams killed in 2012 was 7.2 years old, with only 22.2% of the rams killed being 8 years old and older. One ram less than ¾ curl was killed in 2012. Hunter effort was 12.4 days per ram harvested in 2012, and 14.8 days per ram harvested in 2011, both of which represent some of the highest effort values in this herd

unit, and again echo back to the early 1990s. These figures represent a return to levels that triggered permit reductions in during that time.

Population. The "Time Specific Juvenile – Constant Adult Mortality Rate" (TSJCA) spreadsheet model was chosen to use for the post season population estimate of this herd. Although this model did not have the lowest relative AIC, the population trend is much more reasonable than other models. The postseason 2012 population is estimated to be 850 sheep. Efforts will continue to improve this model.

Similar to Area 3, the number of pickup heads registered recently has supported concerns over the impacts of the 2010-2011 winter. In 2011, 16 pickup heads were registered, representing 167% of the previous 10-year average. Although fewer, the 8 pickup heads registered in 2012 still represent a 33% increase over the previous 10-year average. When Snow Water Equivalent (SWE) is plotted for the Younts Peak SnoTel site, the 2010-2011 winter had well above normal accumulations of snow. Previous years with high SWE levels (1985-86, 1995-96, 1996-97) also began accumulating snow earlier in the winter. The 2010-2011 winter was essentially normal for most of the winter, but quickly began to accumulate and retain above far above average levels of snow in April, May, and June. This was not true for the winter of 1994-95, however, which was only slightly higher than normal in May and June with respect to SWE. Snow (snow depth only measured since 1998) is usually gone by June, but in June 2011 there was still 20 inches at the Younts Peak SnoTel site. The 2010-2011 winter obviously had impacts on this population, as evidenced by the lamb:ewe ratio of 12:100 seen in postseason 2011 surveys.

Management Summary. With the extremely poor lamb production experienced recently, it is likely that the availability of rams will not recover rapidly in this herd unit in coming years as lambs from these cohorts enter mature ram age classes. Maintenance of reduced ram hunting opportunities may be necessary in the near future to preserve or improve ram hunting opportunities. Ram:ewe ratios, average age of harvested rams, and the percentage of rams at least 8 years of age and older should be monitored closely to determine if such a situation is developing. License numbers will be reduced to 20 for the 2013 season. The postseason 2013 population is estimated to be approximately 800 sheep.

Harvest parameters for the Younts Peak Bighorn Sheep Herd Unit, 1984-2012.

	1984-91	1992-95	1996-00*	2001-04*	2005-08*	2009-11*	2012*
Permits	60	48	32	36	40	44+	31
Harvest	33.1	28.3	22.6	32.3	34.0	32.7	18
% Success	59%	62%	74%	87%	83.3%	75.4%	58.1%
Effort (days/ram)	18.6	15.0	8.4	7.9	8.2	10.5	12.4
Avg. Age	6.6	6.5	6.7	7.3	7.3	7.5	7.2
% Rams ≥ 8 Yrs	24.1%	17.5%	33.3%	44.1%	32.7%	47.6%	22.2%
% Rams ≤ ¾ Curl	-	-	11.9%	15.0%	7.2%	5.9%	5.6%

* "any ram" regulation in place

+ 46 permits were issued in 2010 and 2011.

INPUT	
Species:	Bighorn Sheep
Biologist:	Doug McWhirter
Herd Unit & No.:	Younts Peak
Model date:	04/16/13

☑ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	77	86	☐ CJ,CA Model	
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	50	64	☐ SCJ,SCA Mod	
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	37	152	☑ TSJ,CA Model	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population			Total	Predicted Posthunt Population			Total	Objective
	Field Est	Field SE		Juveniles	Total Males	Females		Juveniles	Total Males	Females		
1993				358	266	774	1398	358	237	774	1369	900
1994				325	338	819	1482	325	307	819	1451	900
1995				211	389	848	1448	211	361	848	1420	900
1996				196	366	802	1364	196	341	802	1339	900
1997				185	345	758	1288	185	320	758	1263	900
1998				252	324	716	1293	252	300	716	1269	900
1999				261	319	692	1273	261	292	692	1245	900
2000				212	314	673	1198	212	291	673	1175	900
2001				222	335	677	1234	222	296	677	1195	900
2002				160	310	651	1121	160	278	651	1089	900
2003				261	305	640	1205	261	270	640	1170	900
2004				232	333	665	1229	232	297	665	1193	900
2005				223	347	677	1246	223	311	677	1210	900
2006				245	356	684	1286	245	317	684	1246	900
2007				231	356	685	1272	231	321	685	1238	900
2008				150	345	671	1167	150	306	671	1127	900
2009				202	304	632	1137	202	266	632	1099	900
2010				125	278	606	1010	125	239	606	970	900
2011				102	258	587	947	102	228	587	917	900
2012				113	225	547	884	113	205	547	865	900
2013				102	206	512	821	102	190	512	805	900
2014												
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												

Survival and Initial Population Estimates

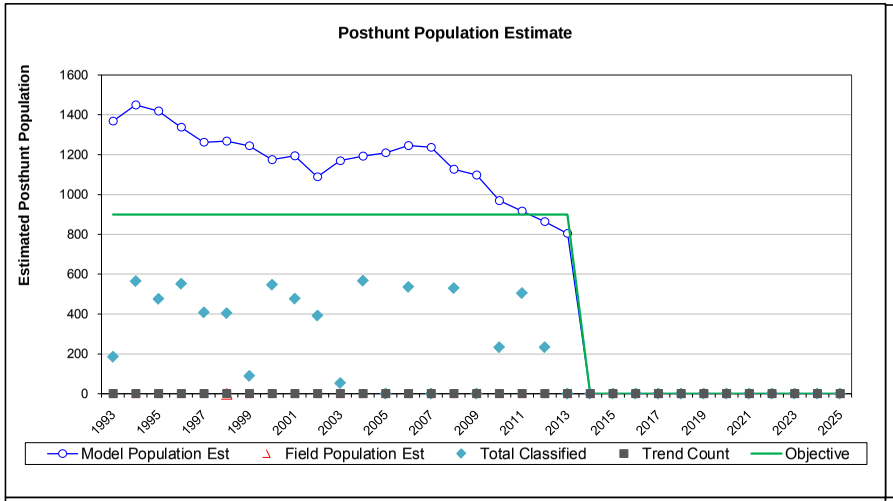
Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.70			0.90		
1994	0.70			0.90		
1995	0.40			0.90		
1996	0.40			0.90		
1997	0.40			0.90		
1998	0.40			0.90		
1999	0.40			0.90		
2000	0.70			0.90		
2001	0.40			0.90		
2002	0.70			0.90		
2003	0.70			0.90		
2004	0.70			0.90		
2005	0.70			0.90		
2006	0.58			0.90		
2007	0.50			0.90		
2008	0.40			0.90		
2009	0.40			0.90		
2010	0.70			0.90		
2011	0.40			0.90		
2012	0.40			0.90		
2013				0.90		
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						

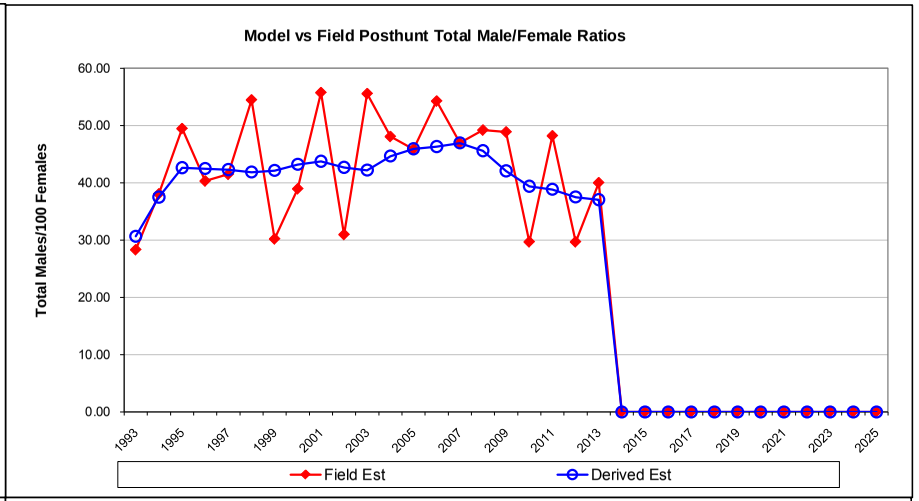
Parameters:	Optim cells
Adult Survival =	0.896
Initial Total Male Pop/10,000 =	0.024
Initial Female Pop/10,000 =	0.077

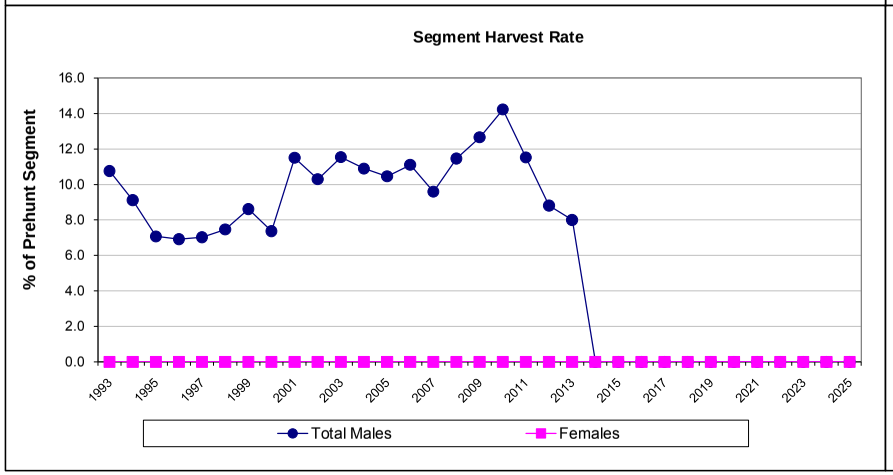
MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%

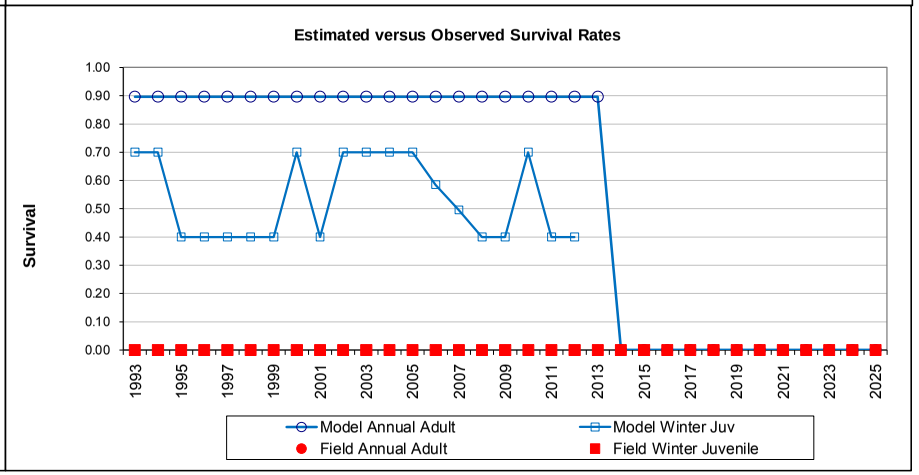
Year	Classification Counts: Juvenile/Female Ratio			Classification Counts: Total Male/Female Ratio			Harvest				Harvest: Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/o bull adj	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females
1993		46.23	7.99	30.65	28.30	5.85	0	26	0	26	10.8	0.0
1994		39.62	4.17	37.50	38.05	4.06	0	28	0	28	9.1	0.0
1995		24.91	3.38	42.63	49.45	5.20	0	25	0	25	7.1	0.0
1996		24.48	3.02	42.49	40.30	4.11	0	23	0	23	6.9	0.0
1997		24.39	3.51	42.28	41.46	4.88	0	22	0	22	7.0	0.0
1998		35.21	4.73	41.88	54.46	6.28	0	22	0	22	7.5	0.0
1999		37.74	9.90	42.14	30.19	8.61	0	25	0	25	8.6	0.0
2000		31.46	3.59	43.20	38.94	4.11	0	21	0	21	7.4	0.0
2001		32.81	4.15	43.73	55.73	5.86	0	35	0	35	11.5	0.0
2002		24.60	3.49	42.67	30.95	4.01	0	29	0	29	10.3	0.0
2003		40.74	14.57	42.20	55.56	17.89	0	32	0	32	11.5	0.0
2004		34.84	3.89	44.67	48.06	4.79	0	33	0	33	10.9	0.0
2005		32.90	5.94	45.93	45.85	7.33	0	33	0	33	10.5	0.0
2006		35.82	4.15	46.30	54.26	5.45	0	36	0	36	11.1	0.0
2007		33.78	6.41	46.94	46.94	7.89	0	31	0	31	9.6	0.0
2008		22.33	2.97	45.57	49.19	4.87	0	36	0	36	11.5	0.0
2009		31.93	4.67	42.06	48.86	6.07	0	35	0	35	12.7	0.0
2010		20.65	4.01	39.38	29.68	4.98	0	36	0	36	14.2	0.0
2011		17.38	2.59	38.85	48.20	4.84	0	27	0	27	11.5	0.0
2012		20.65	4.01	37.51	29.68	4.98	0	18	0	18	8.8	0.0
2013		20.00	3.00	37.04	40.00	4.00	0	15	0	15	8.0	0.0
2014												
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												

FIGURES



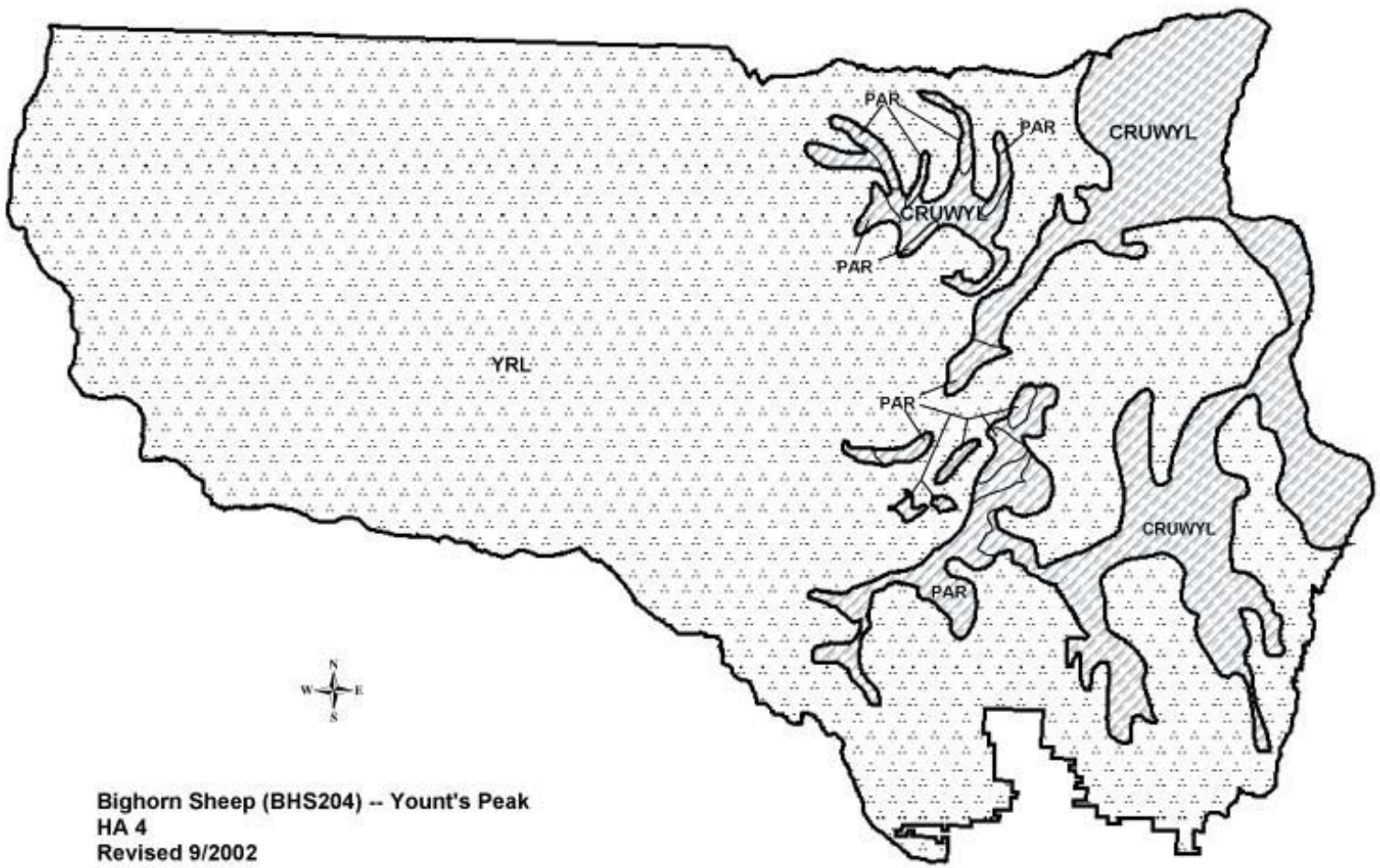






Comments:

END



Bighorn Sheep (BHS204) -- Yount's Peak
HA 4
Revised 9/2002

2012 - JCR Evaluation Form

SPECIES: Bighorn Sheep
PERIOD: 6/1/2012 - 5/31/2013

HERD: BS205 - FRANCS PEAK

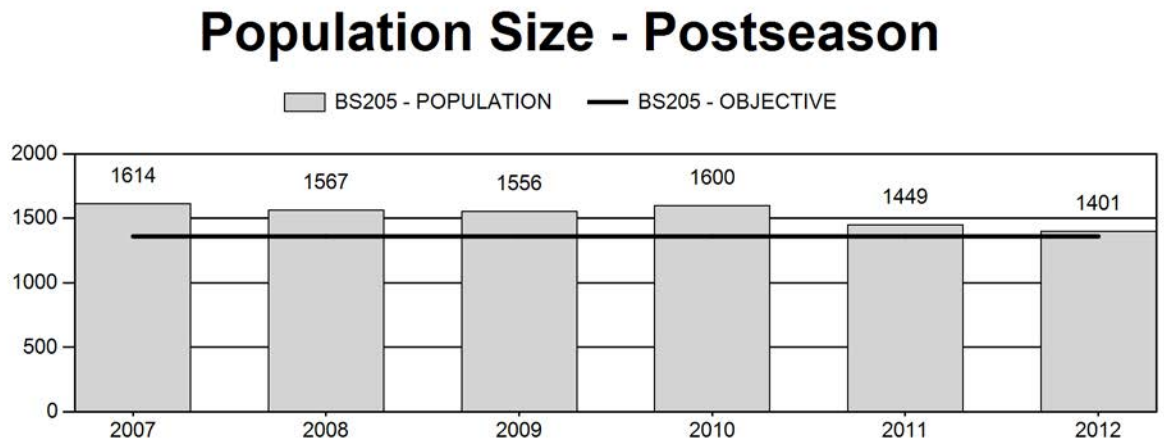
HUNT AREAS: 5, 22, 999
PREPARED BY: BART KROGER

	2007 - 2011 Average	2012	2013 Proposed
Population:	1,557	1,401	1,373
Harvest:	74	92	75
Hunters:	85	110	86
Hunter Success:	87%	84%	87%
Active Licenses:	85	110	86
Active License Percent:	87%	84%	87%
Recreation Days:	546	631	550
Days Per Animal:	7.4	6.9	7.3
Males per 100 Females	55	61	
Juveniles per 100 Females	27	30	

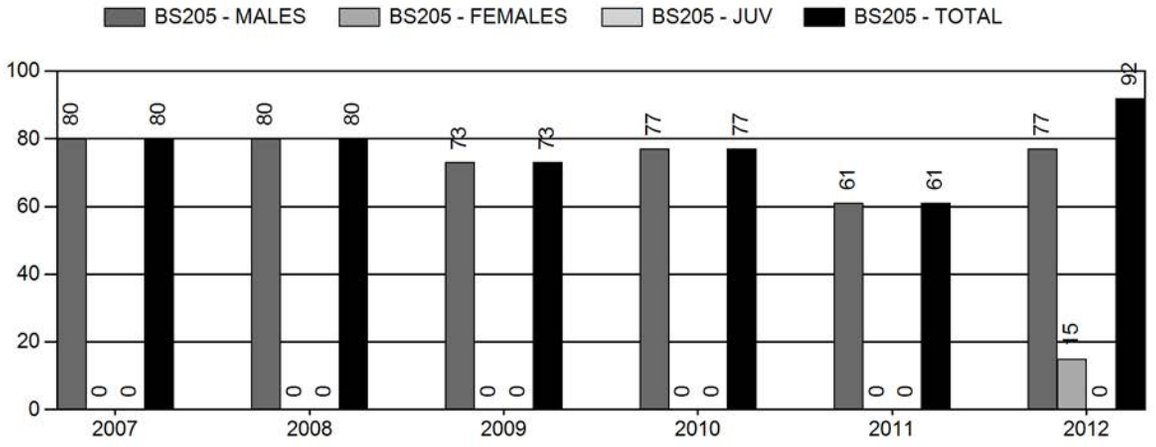
Population Objective:	1,360
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	3%
Number of years population has been + or - objective in recent trend:	20
Model Date:	4/11/2013

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

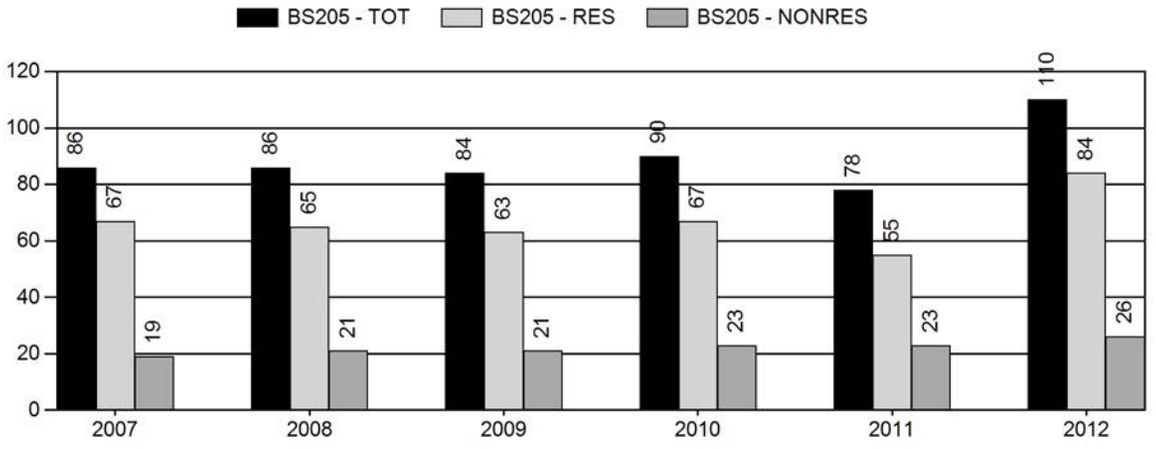
	JCR Year	Proposed
Females ≥ 1 year old:	2%	1%
Males ≥ 1 year old:	19%	17%
Juveniles (< 1 year old):	0%	0%
Total:	6%	5%
Proposed change in post-season population:	-1%	-1%



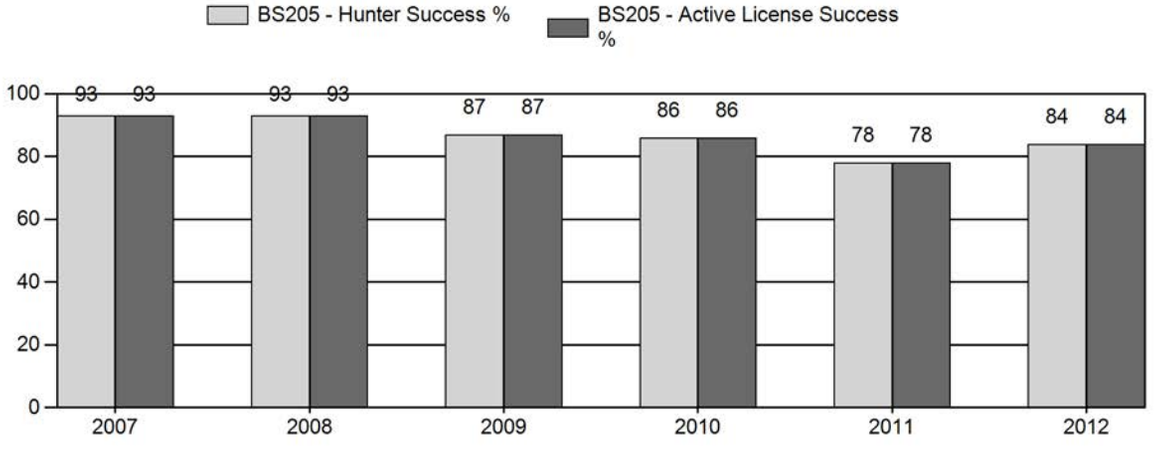
Harvest



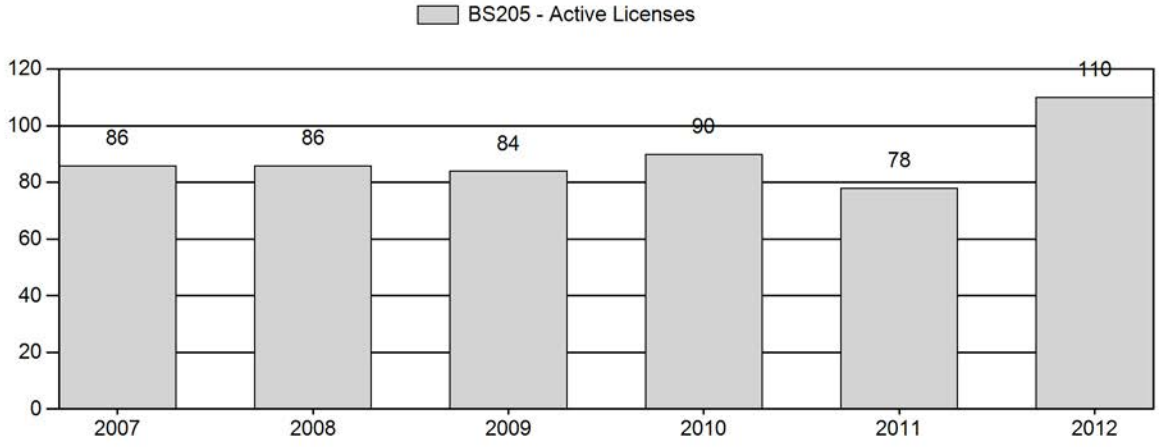
Number of Hunters



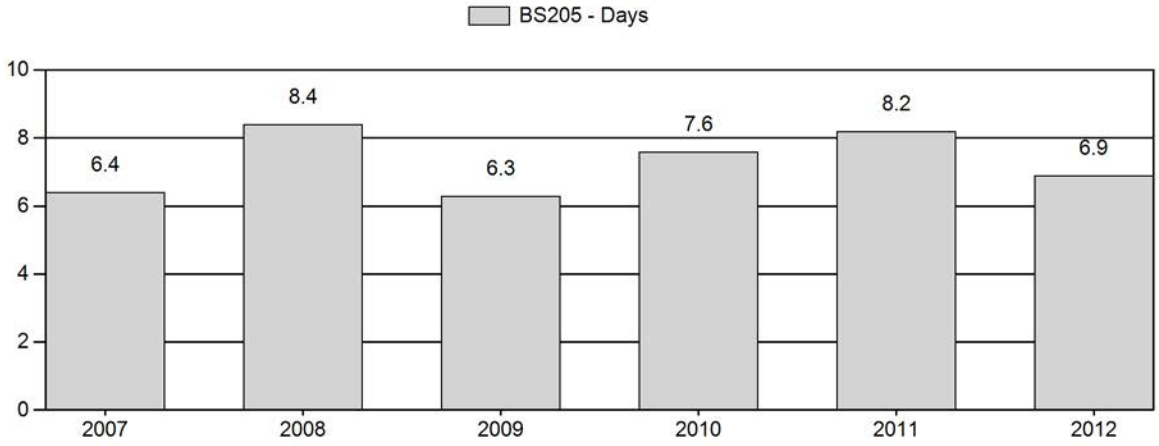
Harvest Success



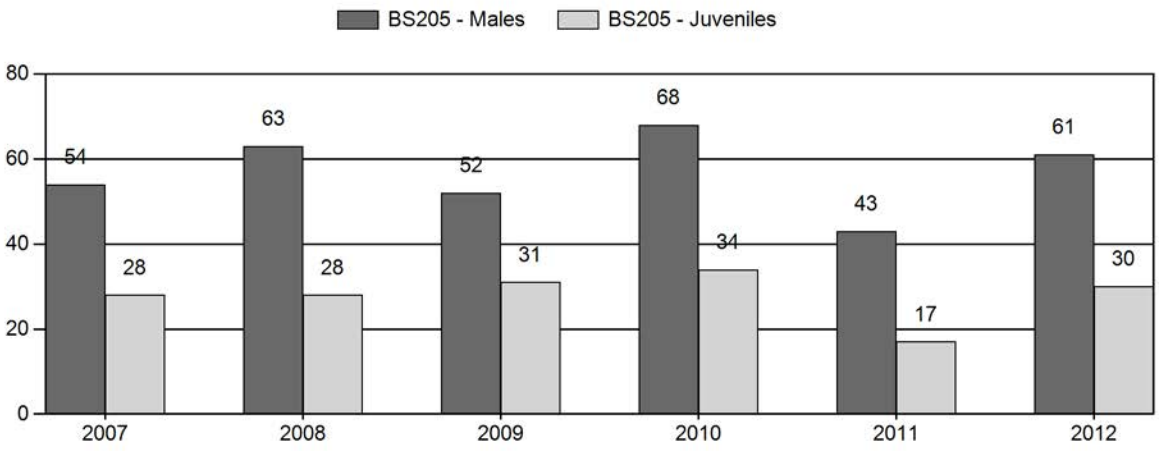
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2007 - 2012 Postseason Classification Summary

for Bighorn Sheep Herd BS205 - FRANCS PEAK

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	1,614	0	313	313	30%	579	55%	162	15%	1,054	580	0	54	54	± 3	28	± 2	18
2008	1,567	0	0	217	33%	345	52%	97	15%	659	670	0	0	63	± 5	28	± 3	17
2009	1,556	0	0	221	28%	425	55%	131	17%	777	566	0	0	52	± 4	31	± 3	20
2010	1,600	0	153	153	34%	225	50%	76	17%	454	727	0	68	68	± 8	34	± 5	20
2011	1,449	0	0	172	27%	400	62%	68	11%	640	445	0	0	43	± 4	17	± 2	12
2012	1,401	0	140	140	32%	228	52%	68	16%	436	802	0	61	61	± 7	30	± 4	18

2013 HUNTING SEASONS
FRANCS PEAK BIGHORN SHEEP HERD (BS205)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	Limitations
5	1	Sep. 1	Oct. 31	57	Limited quota; any ram (43 residents, 14 nonresidents)
	6	Oct. 15	Oct. 31	8	Limited quota; ewe or lamb valid in that portion of Area 5 within the Greybull River drainage of the Washakie Wilderness; also valid in the Jack Creek and Pickett Creek drainages
22	1	Sep. 1 Oct. 1	Oct. 31 Oct. 31	4	Limited quota; any ram Unused Area 22 Type 1 licenses also valid in Area 5
WRIR	1	Sep. 10	Nov. 30	12	Limited quota; 12 licenses any ram
Archery		Aug. 15	Aug. 31		Refer to Section 3

Hunt Area	Type	Quota change from 2012
5	1	-1
	6	-12
HU Total	**1**	**-1**
	6	**-12**

Management Evaluation
Current Postseason Population Management Objective: 1,360
Management Strategy: Avg. age of harvested rams from 6-8 years
2012 Postseason Population Estimate: 1,400
2013 Proposed Postseason Population Estimate: 1,400

Herd Unit Issues. The management strategy for this sheep herd is to maintain an average age of harvested rams between 6-8 years old, along with a hunter success of >80%. The herd objective and management strategy will be revised in 2013. Using a population objective and model estimate for this sheep herd has always been questionable. Field personnel feel and have continually used hunter success and average age of harvested rams as the main gauge for setting seasons. Lamb ratios are also monitored closely to anticipate potential changes in age classes of rams. Relative densities of sheep vary within the herd unit. In hunt area 5, much of the occupied habitat occurs at alpine elevations, whereas in hunt area 22, a number of sheep occupy the badlands north of the Wind River, with some sheep spending time on irrigated meadows on the Fish Ranch. In the Owl Creek Mountain's of the WRIR, bighorn sheep are found year round above 9,500'. For the most part, this sheep herd has remained mostly stable the past 7 years, with a slight decline starting to be noticed after the 2010/11 winter, when it appeared some

winter die-off had occurred. In fact, since January 2011, 104 ram pickup heads have been registered, which is about 150% above normal.

Weather. The winters of 2011/12 and 2012/13 were mild with low snowpack resulting in mostly good over winter survival. However, the winter of 2010/11 appeared to have been severe enough to cause some die-off as well as reduced lamb production. The extreme dry conditions of 2012 resulted is some changes to distribution of sheep on their summer range, likely because of reduced forage production and condition.

Habitat. Habitat conditions for the most part are considered good to excellent in this herd unit. The Little Venus fire in 2006, and the Norton Point fire in 2011 improved overall forage availability and production in hunt area 5. The drought conditions in 2012 did cause lower than normal forage production.

Field Data. Aerial classifications surveys are used in obtaining post-season lamb and ram ratio for this sheep herd. On average about 400-800 sheep are classified annually. Lamb:ewe ratios for the herd have remained favorable the past 10 years, with an average ratio of 30:100. Ram:ewe ratios typically exceed 50:100. In 2011 lamb ratios were only 16:100, the lowest in 10 years. This reduced lamb ratio, along with the current die-off may result in a decline in hunting opportunity in the future. A late winter flight in mid-April 2013 resulted in 350 sheep being observed, about 50 less than in January 2013, but with a similar number of rams being observed and only a slight decline in the lamb ratio. The decline in the number of sheep being observed between the January and April flight was not significant enough to warrant any changes to either the current hunting season structure or to cause any heighten concern about a major die-off.

Harvest Data. Annual hunter numbers in this herd unit have fluctuated since 2007, but on average area 5 has about 71 hunters, area 22 about 2-3 hunters, and the WRIR about 10 hunters. Annual harvest since 2007 has been about 75 rams for the herd unit, with roughly 65 from area 5, 1-2 from area 22, and about 6-8 from the WRIR. Hunter success is typically about 85-90%, with hunter effort at about 6-8 days/animal harvested. In hunt area 5 since 2007, the age of harvested rams has averaged about 7.7 years. The percent of harvested rams $\geq$ 8 years of age has averaged about 45%. The 2012 ewe harvest in area 5 showed 15 ewes being harvested for a hunter success of 75%. This was the first year for ewe hunting in any Wyoming sheep hunt area. Because of this, we would like to keep using these ewe hunts to not only manage ewe populations on winter ranges, but to also promote public awareness and acceptance of these ewe hunts.

Population. The constant juvenile & constant adult survival (CJ, CA) spreadsheet model was chosen to represent this herd because it reflects a good recent year trend (2011-2013) in the population. However, the long-term trend contradicts field personnel perceptions, harvest data and classification sample sizes, which indicate a mostly stable population for at least the past 10 years. Because of this, the overall model is considered mostly unreliable. The model supported an AIC value of 155, which was not the lowest of the three models. The model is considered a poor representation of the herd.

Management Summary

The low lamb ratios in 2011 (16:100) and the recent ram pickup heads (n=104) possess some concerns for this sheep herd. Because of this, we will keep license quotas similar to 2012, with

only a drop of one license for the Type 1 quota in area 5. For the Type 6 season in area 5, we will reduce this quota by 12 licenses, but include the Jack Creek and Pickett Creek drainages as part of the area limitation. The projected 2013 harvest for the herd unit is roughly 70 rams and 6-7 ewes. The 2013 post-season population estimate will again be around 1,400 sheep.

INPUT	
Species:	Bighorn Sheep
Biologist:	Bart Kroger
Herd Unit & No.:	Francs Peak, BS205
Model date:	04/11/13

☑ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	146	155	☑ CJ,CA Model	
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	114	123	☐ SCJ,SCA M	
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	90	218	☐ TSJ,CA Model	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population				Predicted Posthunt Population				Objective
	Field Est	Field SE		Juveniles	Total Males	Females	Total	Juveniles	Total Males	Females	Total	
1993				351	438	1062	1851	351	386	1062	1799	1360
1994				279	490	1071	1840	279	432	1071	1783	1360
1995				307	497	1047	1851	307	441	1047	1795	1360
1996				302	518	1038	1859	302	452	1038	1793	1360
1997				303	525	1029	1857	303	465	1029	1797	1360
1998				261	536	1021	1818	261	471	1021	1754	1360
1999				356	523	996	1875	356	475	996	1827	1360
2000				331	569	1017	1917	331	512	1017	1860	1360
2001				231	589	1023	1843	231	529	1023	1783	1360
2002				236	559	984	1779	236	497	984	1717	1360
2003				229	534	952	1715	229	472	952	1654	1360
2004				293	509	922	1724	293	438	922	1653	1360
2005				241	508	925	1675	241	440	925	1606	1360
2006				331	487	904	1722	331	428	904	1663	1360
2007				259	517	926	1702	259	429	926	1614	1360
2008				257	485	913	1655	257	397	913	1567	1360
2009				278	457	901	1636	278	377	901	1556	1360
2010				304	449	900	1653	304	364	900	1568	1360
2011				155	450	911	1516	155	383	911	1449	1360
2012				249	399	853	1501	249	317	835	1401	1360
2013				224	384	830	1438	224	324	826	1373	1360
2014												1360
2015												1360
2016												1360
2017												1360
2018												1360
2019												1360
2020												1360
2021												1360
2022												1360
2023												1360
2024												1360
2025												1360

Survival and Initial Population Estimates

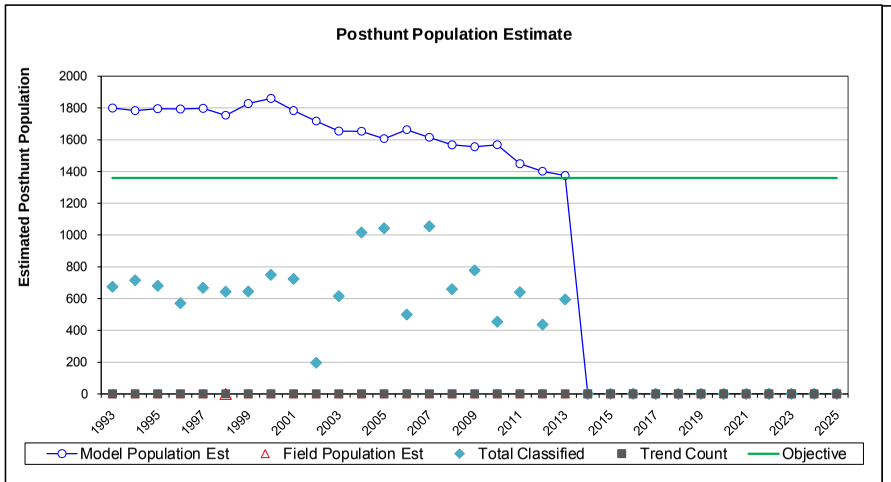
Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.90			0.86		
1994	0.90			0.86		
1995	0.90			0.86		
1996	0.90			0.86		
1997	0.90			0.86		
1998	0.90			0.86		
1999	0.90			0.86		
2000	0.90			0.86		
2001	0.90			0.86		
2002	0.90			0.86		
2003	0.90			0.86		
2004	0.90			0.86		
2005	0.90			0.86		
2006	0.90			0.86		
2007	0.90			0.86		
2008	0.90			0.86		
2009	0.90			0.86		
2010	0.90			0.86		
2011	0.90			0.86		
2012	0.90			0.86		
2013	0.90			0.86		
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						

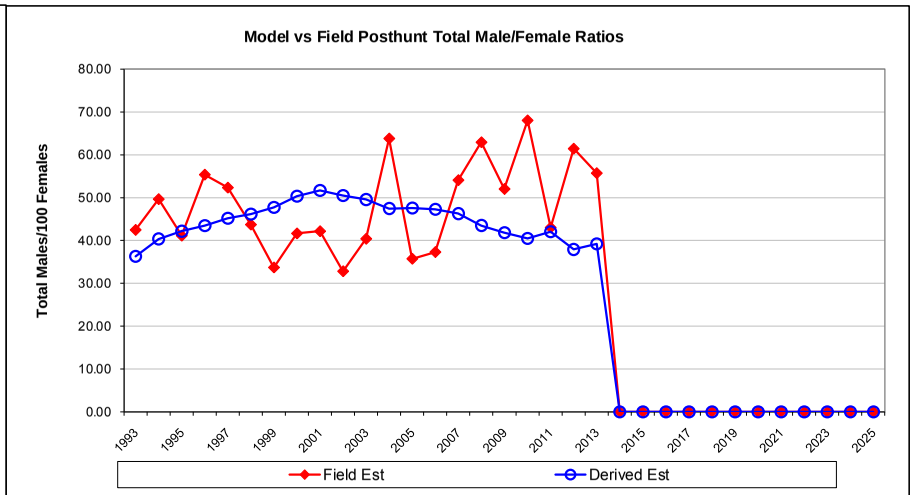
Parameters:	Optim cells
Juvenile Survival =	0.900
Adult Survival =	0.860
Initial Total Male Pop/10,000 =	0.039
Initial Female Pop/10,000 =	0.106

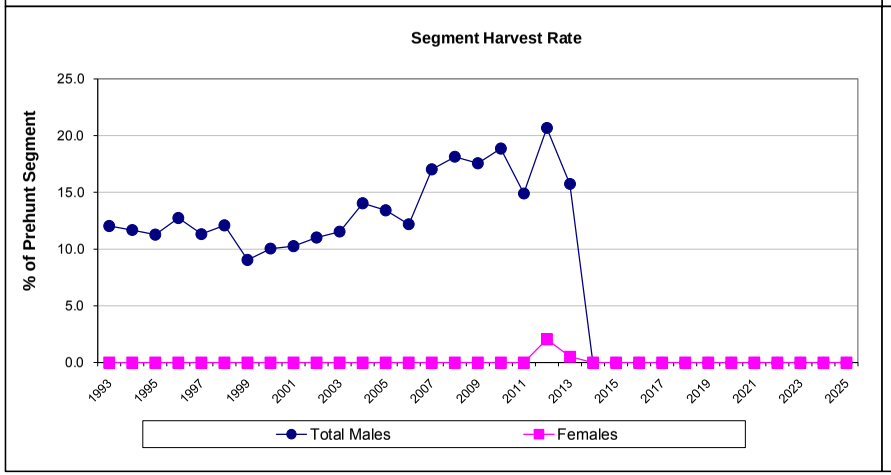
MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%

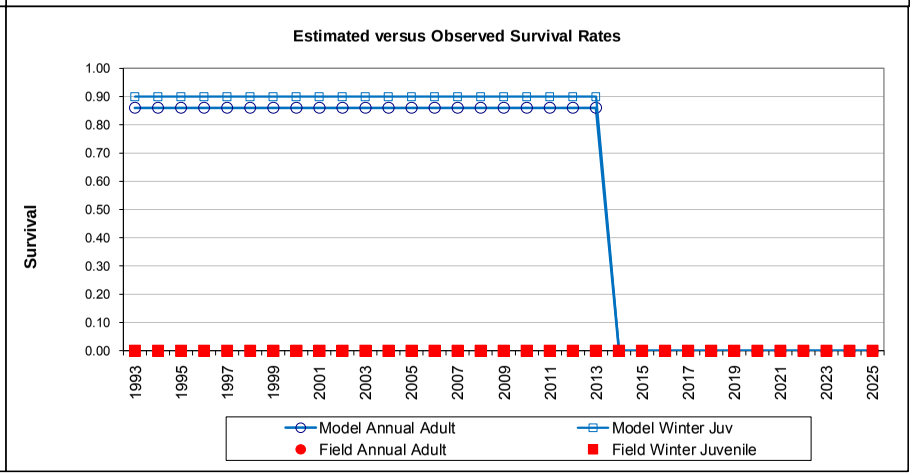
Year	Classification Counts: Juvenile/Female Ratio			Classification Counts: Total Male/Female Ratio			Harvest				Harvest: Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/o bull adj	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females
1993		33.07	3.39	36.30	42.45	3.97	0	48	0	48	12.0	0.0
1994		26.04	2.84	40.36	49.63	4.27	0	52	0	52	11.7	0.0
1995		29.32	3.08	42.16	41.10	3.81	0	51	0	51	11.3	0.0
1996		29.13	3.49	43.49	55.34	5.27	0	60	0	60	12.7	0.0
1997		29.43	3.22	45.20	52.32	4.66	0	54	0	54	11.3	0.0
1998		25.53	2.90	46.15	43.68	4.06	0	59	0	59	12.1	0.0
1999		35.79	3.58	47.75	33.68	3.44	0	43	0	43	9.0	0.0
2000		32.56	3.17	50.36	41.63	3.70	0	52	0	52	10.0	0.0
2001		22.55	2.51	51.68	42.14	3.69	0	55	0	55	10.3	0.0
2002		24.00	4.88	50.52	32.80	5.90	0	56	0	56	11.0	0.0
2003		24.06	2.83	49.57	40.37	3.89	0	56	0	56	11.5	0.0
2004		31.79	2.84	47.46	63.78	4.49	0	65	0	65	14.0	0.0
2005		26.09	2.26	47.58	35.71	2.74	0	62	0	62	13.4	0.0
2006		36.59	4.17	47.30	37.28	4.22	0	54	0	54	12.2	0.0
2007		27.98	2.49	46.27	54.06	3.79	0	80	0	80	17.0	0.0
2008		28.12	3.23	43.50	62.90	5.45	0	80	0	80	18.1	0.0
2009		30.82	3.08	41.83	52.00	4.31	0	73	0	73	17.6	0.0
2010		33.78	4.48	40.50	68.00	7.13	0	77	0	77	18.9	0.0
2011		17.00	2.23	42.07	43.00	3.92	0	61	0	61	14.9	0.0
2012		29.82	4.12	37.91	61.40	6.59	0	75	16	91	20.7	2.1
2013		27.08	3.25	39.21	55.69	5.17	0	55	4	59	15.7	0.5
2014												
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												

FIGURES



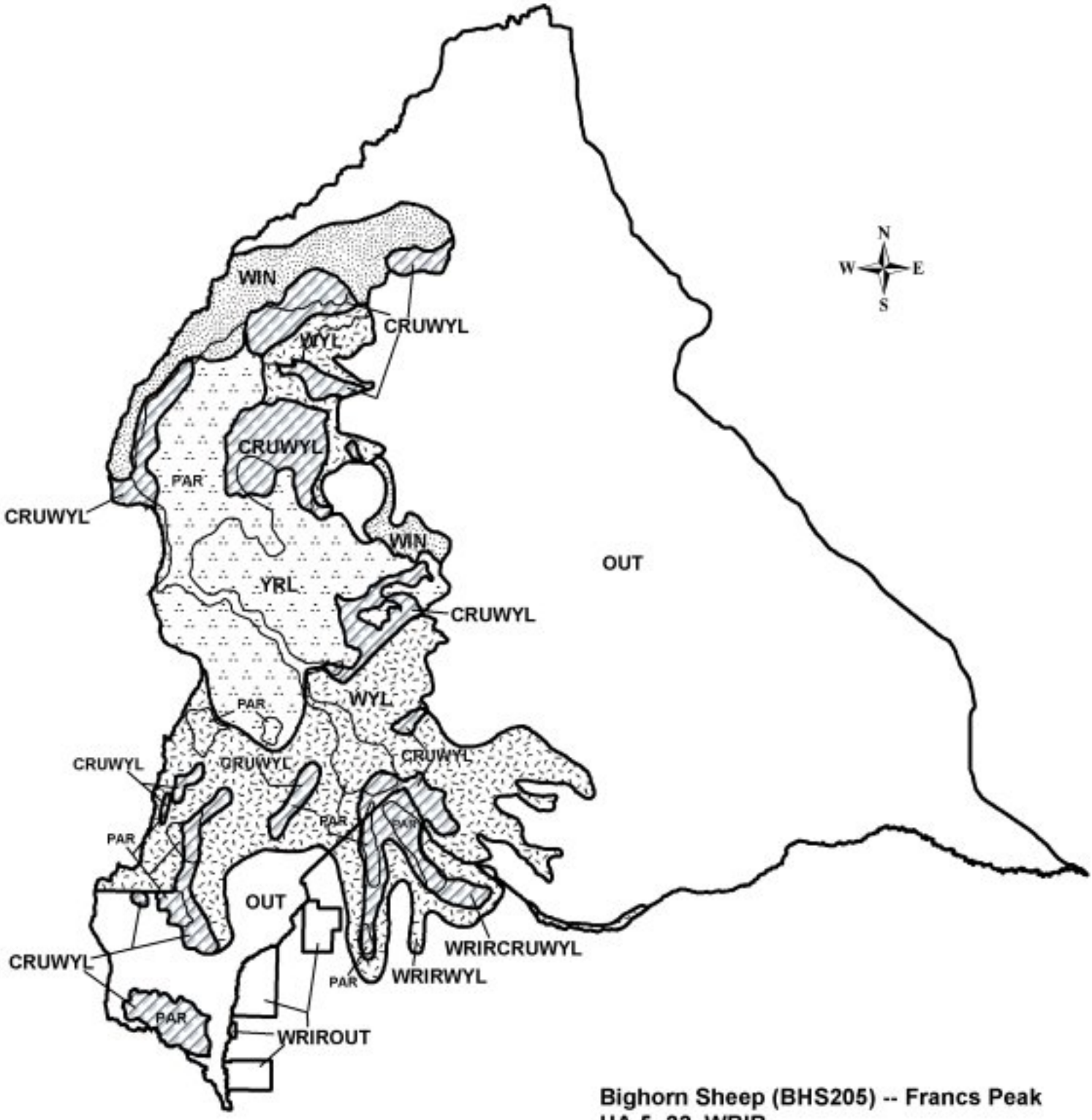






Comments:

END



Bighorn Sheep (BHS205) -- Francs Peak
HA 5, 22, WRIR
Revised 9/2002

2012 - JCR Evaluation Form

SPECIES: Bighorn Sheep | PERIOD: 6/1/2012 - 5/31/2013

HERD: BS212 - DEVIL'S CANYON

HUNT AREAS: 12 | PREPARED BY: TOM EASTERLY

	2007 - 2011 Average	2012	2013 Proposed
Population:	N/A	N/A	N/A
Harvest:	1	2	2
Hunters:	1	2	2
Hunter Success:	100%	100%	100%
Active Licenses:	1	2	2
Active License Percent:	100%	100%	100%
Recreation Days:	12	17	20
Days Per Animal:	12	8.5	10
Males per 100 Females	43	35	
Juveniles per 100 Females	54	59	

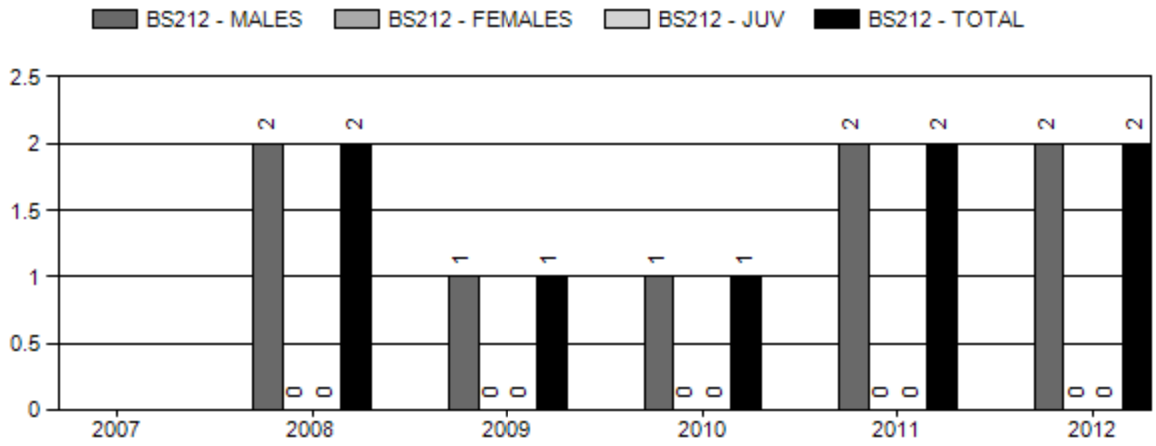
Population Objective:	200
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	N/A%
Number of years population has been + or - objective in recent trend:	6
Model Date:	None

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

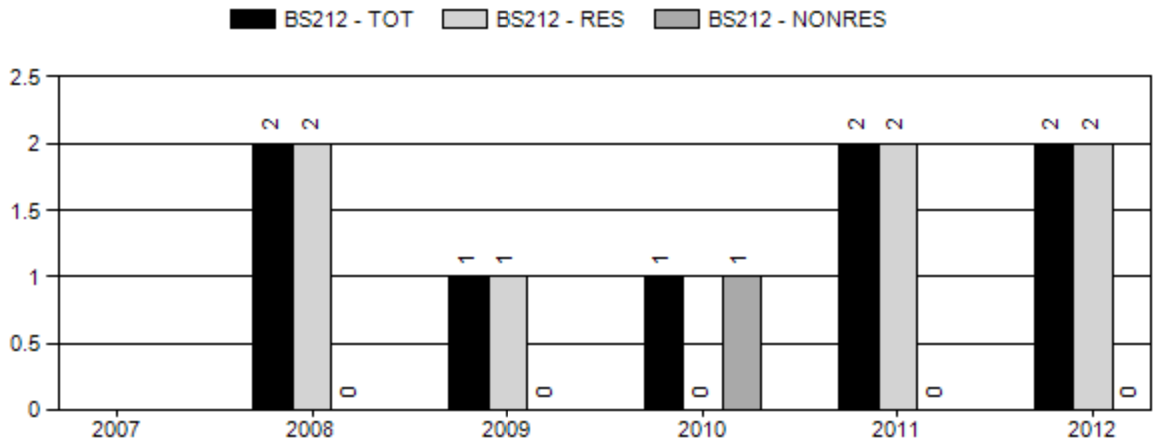
	JCR Year	Proposed
Females ≥ 1 year old:	na%	na%
Males ≥ 1 year old:	na%	na%
Juveniles (< 1 year old):	na%	na%
Total:	na%	na%
Proposed change in post-season population:	na%	na%

Population Size - Postseason

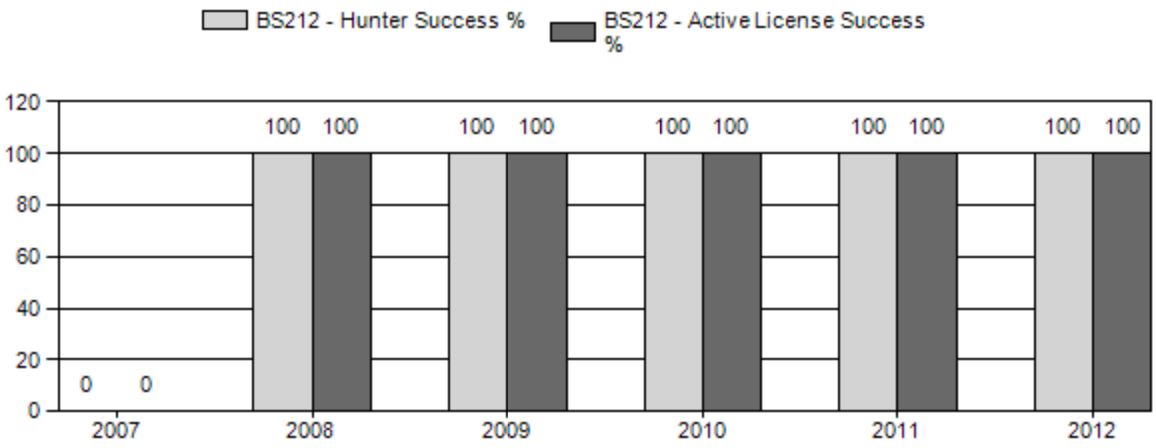
Harvest



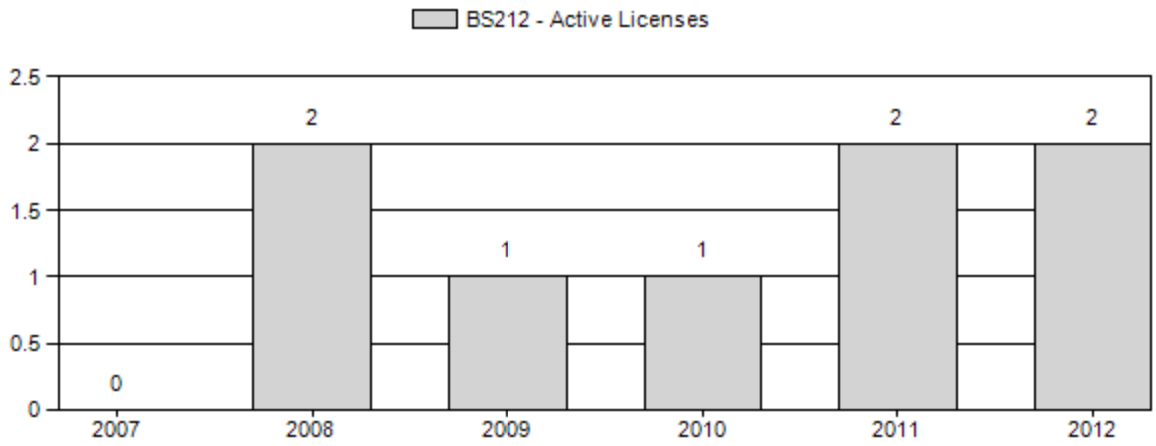
Number of Hunters



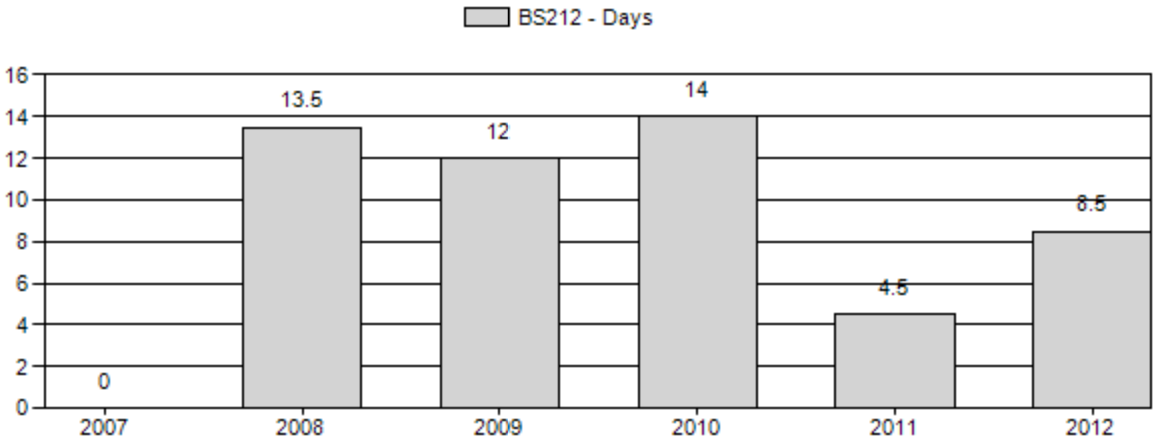
Harvest Success



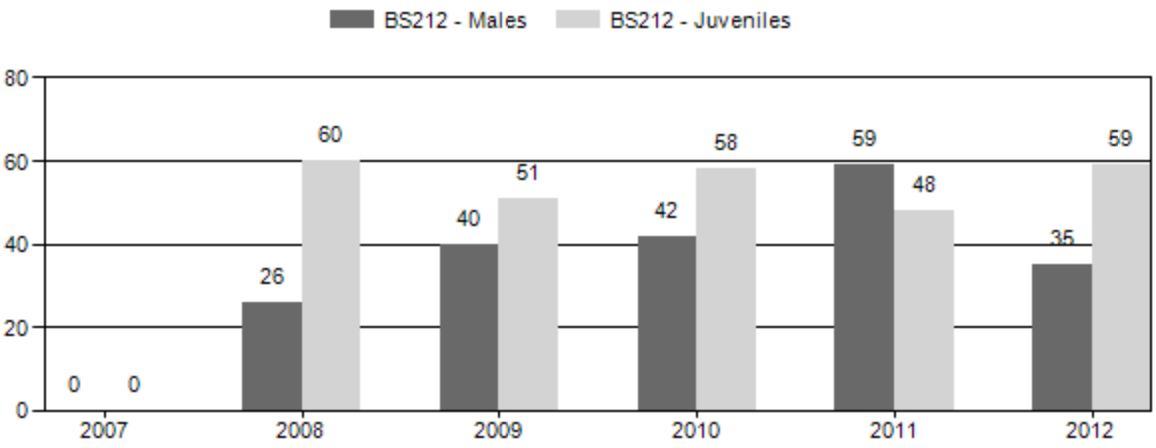
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2007 - 2012 Preseason Classification Summary

for Bighorn Sheep Herd BS212 - DEVIL'S CANYON

Year	Pre Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007		0	0	0	0%	0	0%	0	0%			0	0	0	± 0	0	± 0	0
2008		0	0	15	14%	57	54%	34	32%	106		0	0	26	± 0	60	± 0	47
2009		0	0	27	21%	67	52%	34	27%	128		0	0	40	± 0	51	± 0	36
2010		6	18	27	21%	64	50%	37	29%	128	142	9	28	42	± 0	58	± 0	41
2011		0	41	41	29%	69	48%	33	23%	143	141	0	59	59	± 0	48	± 0	30
2012		0	12	17	18%	49	52%	29	31%	95	142	0	24	35	± 0	59	± 0	44

2012 Harvest data

for Bighorn Sheep Herd BS212 - Devil's Canyon

Area	Type	Active Lic/ Htrs		Ram	Ewe	Lamb	Total	Success		Days/ Harvest	Days	Licenses Sold
12 DEVIL'S CANYON												
	Type 1	2		2	0	0	2	100%		8.5	17	2
Pooled Total		2	(2)*	2	0	0	2	100%	(100%)*	8.5	17	
Pooled Resident		2		2	0	0	2	100%		8.5	17	
Pooled Nonresident		0		0	0	0	0	0		0	0	
2012 Hunt Area Total		2	(2)*	2	0	0	2	100%	(100%)*	8.5	17	2
2012 Herd Total		2	(2)*	2	0	0	2	100%	(100%)*	8.5	17	2

*Active Licenses

2012 - JCR Evaluation Form

SPECIES: Bighorn Sheep | PERIOD: 6/1/2012 - 5/31/2013

HERD: BS212 - DEVIL'S CANYON

HUNT AREAS: 12 | PREPARED BY: TOM EASTERLY

	2007 - 2011 Average	2012	2013 Proposed
Population:	N/A	N/A	N/A
Harvest:	1	2	2
Hunters:	1	2	2
Hunter Success:	100%	100%	100%
Active Licenses:	1	2	2
Active License Percent:	100%	100%	100%
Recreation Days:	12	17	20
Days Per Animal:	12	8.5	10
Males per 100 Females	43	35	
Juveniles per 100 Females	54	59	

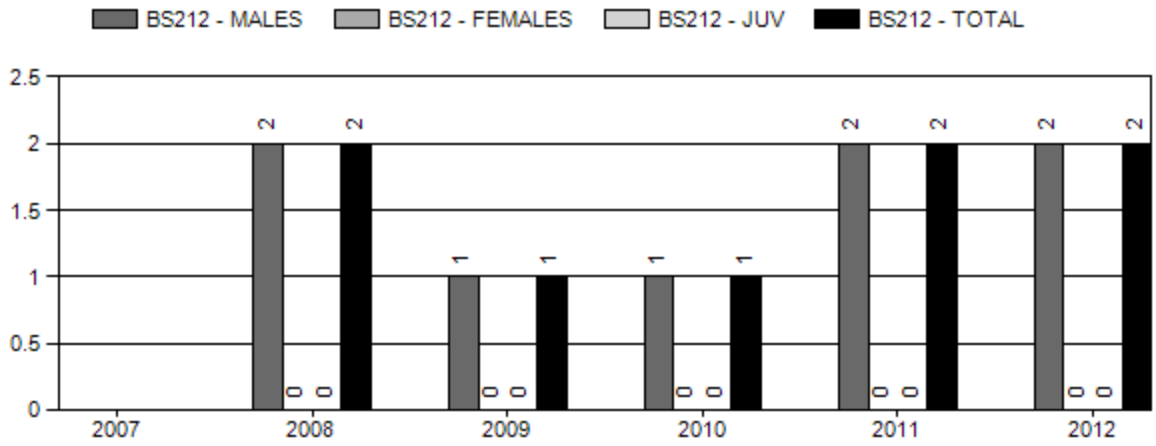
Population Objective:	200
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	N/A%
Number of years population has been + or - objective in recent trend:	6
Model Date:	None

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

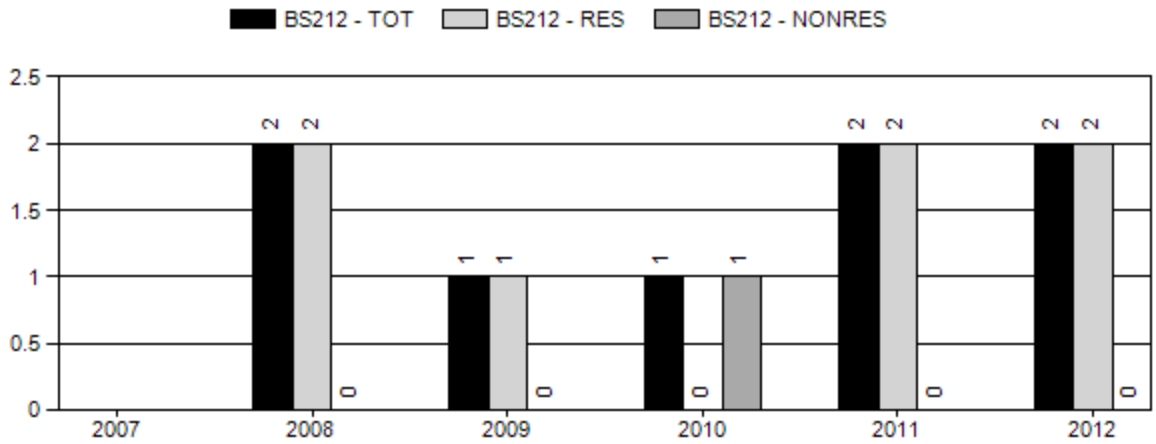
	JCR Year	Proposed
Females ≥ 1 year old:	na%	na%
Males ≥ 1 year old:	na%	na%
Juveniles (< 1 year old):	na%	na%
Total:	na%	na%
Proposed change in post-season population:	na%	na%

Population Size - Postseason

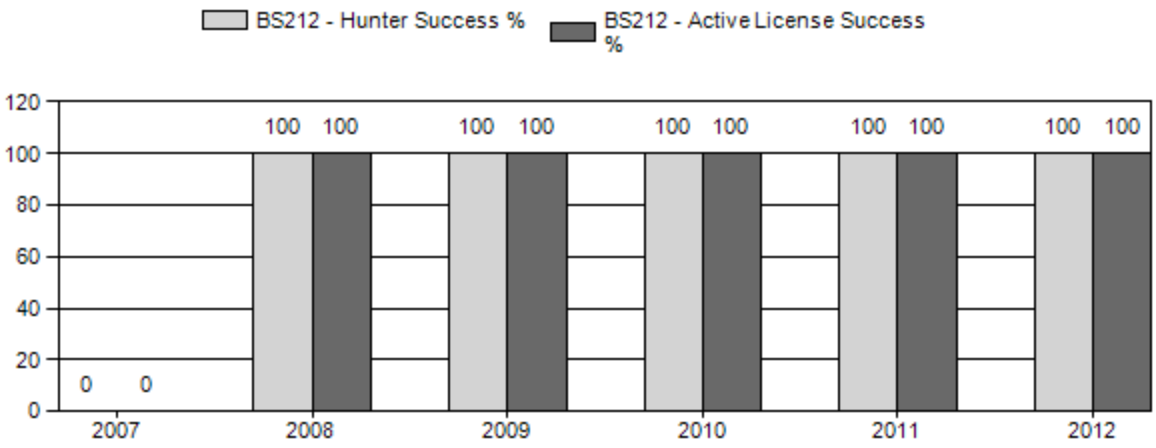
Harvest



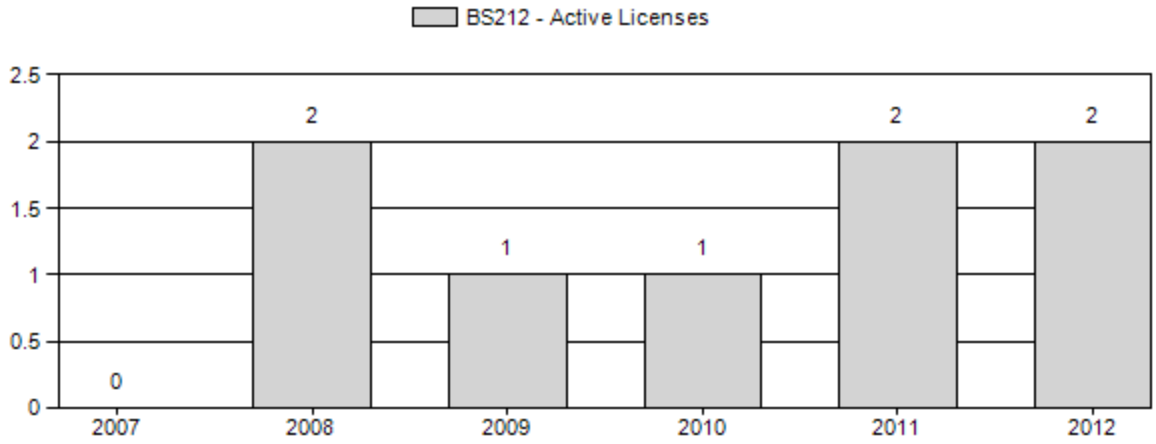
Number of Hunters



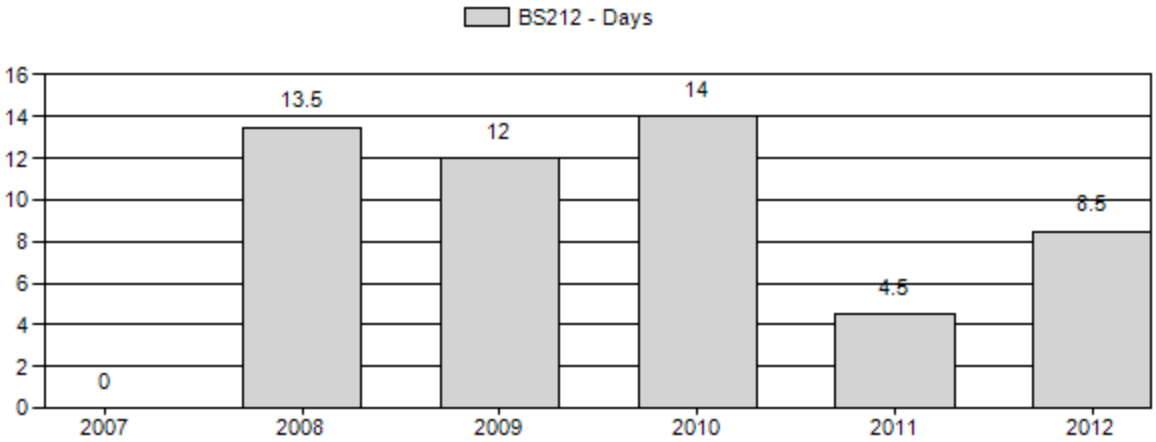
Harvest Success



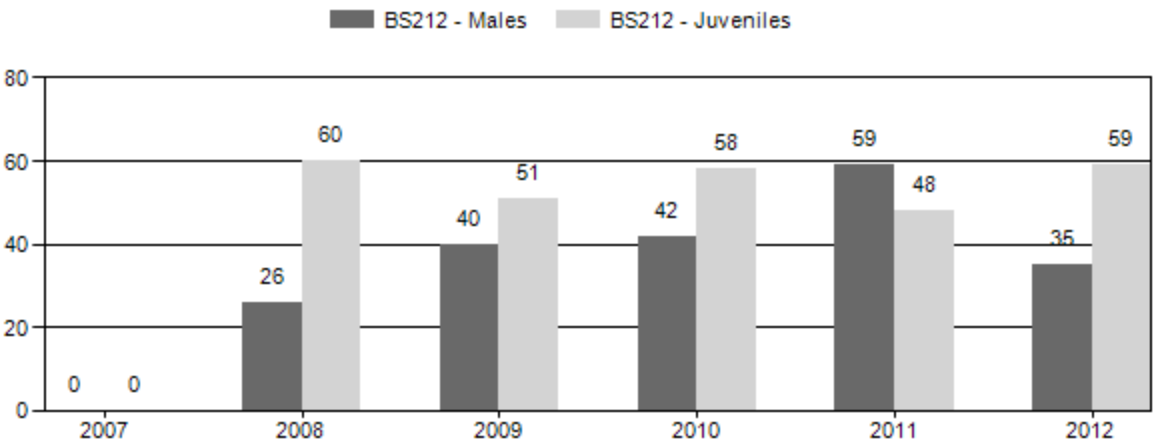
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2007 - 2012 Preseason Classification Summary

for Bighorn Sheep Herd BS212 - DEVIL'S CANYON

Year	Pre Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007		0	0	0	0%	0	0%	0	0%			0	0	0	± 0	0	± 0	0
2008		0	0	15	14%	57	54%	34	32%	106		0	0	26	± 0	60	± 0	47
2009		0	0	27	21%	67	52%	34	27%	128		0	0	40	± 0	51	± 0	36
2010		6	18	27	21%	64	50%	37	29%	128	142	9	28	42	± 0	58	± 0	41
2011		0	41	41	29%	69	48%	33	23%	143	141	0	59	59	± 0	48	± 0	30
2012		0	12	17	18%	49	52%	29	31%	95	142	0	24	35	± 0	59	± 0	44

2012 Harvest data

for Bighorn Sheep Herd BS212 - Devil's Canyon

Area	Type	Active Lic/ Htrs		Ram	Ewe	Lamb	Total	Success		Days/ Harvest	Days	Licenses Sold
12 DEVIL'S CANYON												
	Type 1	2		2	0	0	2	100%		8.5	17	2
Pooled Total		2	(2)*	2	0	0	2	100%	(100%)*	8.5	17	
Pooled Resident		2		2	0	0	2	100%		8.5	17	
Pooled Nonresident		0		0	0	0	0	0		0	0	
2012 Hunt Area Total		2	(2)*	2	0	0	2	100%	(100%)*	8.5	17	2
2012 Herd Total		2	(2)*	2	0	0	2	100%	(100%)*	8.5	17	2

*Active Licenses

2013 HUNTING SEASONS
DEVIL'S CANYON BIGHORN SHEEP HERD UNIT (BS212)

Hunt Area	Type	Dates of Seasons		Quota	Limitations
		Opens	Closes		
12	1	Sep. 1	Oct. 15	2	Limited quota; any ram (1 resident, 1 nonresident)
Archery		Aug. 15	Aug. 31		Refer to Section 3 of this Chapter

Hunt Area	License Type	Quota change from 2012
12	1	0
Total	1	0

Management Evaluation

Current Postseason Population Management Objective: 200
2012 Postseason Population Estimate: ~180
2013 Proposed Postseason Population Estimate: ~180

Herd Unit Issues. Prior to the first transplant (1973) into the Devil's Canyon area, a goal of 200 bighorn sheep was established. That population objective was carried over following the most recent transplants (2004, 2006). No population model/estimate has been developed for this small herd. The population objective is scheduled to be reviewed in 2014 and it is expected that the population will be near that level by then.

This herd unit is mostly public land (90%) managed by the BLM. The one landowner (family corporation) controls almost all access to areas occupied by bighorns. Anthropogenic factors have limited impacts on this population. Since access to this area is difficult, public use of the area is low. No human development (oil/gas, mining, housing) currently affect this population or their habitats. There is limited farming (irrigated pastures) on a small portion of private land. Bighorn are attracted to those pastures especially during drought years. The landowners have commented on the concentration of sheep on those pastures, but have not "complained".

Weather. Climatic conditions probably have the most influence on productivity and survival of this population. In 2012, temperatures were above normal throughout the region and precipitation was 4-5 inches below normal at airport weather stations (Greybull, Worland). Precipitation closer to the Bighorn Mountains was somewhat higher than what accumulated near those towns, although no site-specific data was available. Drought also occurred in the Bighorn Basin between 2000-04.

Habitat. Drought may be affecting production of herbaceous vegetation and extended dry conditions may be impacting shrub production and survival. Cheatgrass has become established in the area and dominant on some sites.

Field Data. Although drought conditions were documented during summer 2012 across most of Wyoming, affects on this bighorn sheep herd appear to have been minimal. The lamb:ewe ratio observed in summer 2012 (59:100) was higher than in 2011 (48:100), thus drought probably did not impact lamb survival (birth to July). Hunters mentioned that the two harvested bighorn rams were in good body condition and bighorns observed in September appeared to be in good physical condition. Use of irrigated pastures may have negated negative effects of drought. During the 2012 pre-season survey, WGFD personnel observed a total of 17 rams (5 class I rams, 9 class II rams, 3 class III rams, and 0 class IV rams).

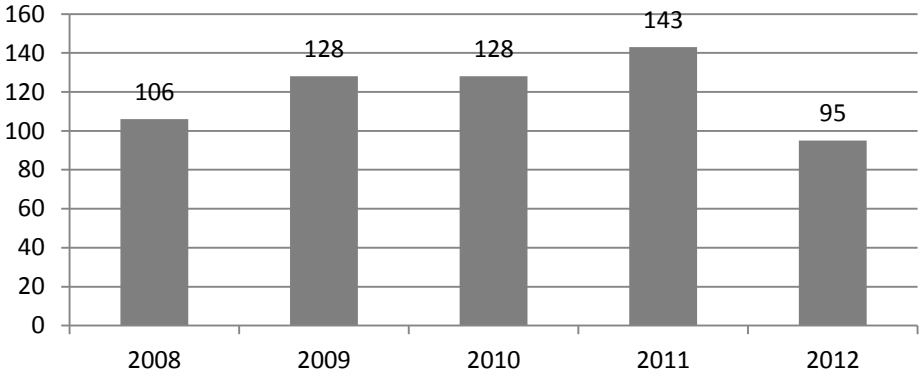
Harvest Data. Harvest statistics will also provide little information about trend of this population. Only one or two licenses have been issued since 2008 and hunter success has been 100% each year. Recreation days and days per harvested animal vary depending on amount of time each hunter was able to allocate to his/her hunt. Average age of harvested rams also does not indicate a trend since only 1-2 rams were harvested each year. It was believed that the ram harvested in 2010 was incorrectly aged (10 years) based upon the hunter's comments and count of annual rings on photos. Also, genetics of rams from the recent transplants allowed for more growth of those young rams. One ram from Missouri River breaks (Montana) was harvested as a 6-year old (scored >180).

Most hunters in this herd have commented favorably on their hunter experience. One hunter in 2012, however, was dissatisfied with the number and size or rams that they observed. She harvested an 8-year old ram.

Population. Insufficient data has been collected for building a population model, thus there is no reliable estimate of the number of bighorns in this population. Pre-season (summer) classification surveys have been conducted the past five years. That data has also been used to indicate population trend. This population is believed to be increasing.

Total number of sheep observed during classification surveys may give the most consistent estimate of the trend in the population (Fig. 1). However, some surveys were not conducted across all areas used by bighorns and effort (flight time, aerial vs. ground) has not been consistent across years. Less flight time was spent during the 2012 classification flight which resulted in fewer sheep being observed. During September 2012, 139 bighorn were observed during a ground survey, so it is evident the 2012 pre-season survey was incomplete. Aerial trend counts will continue as budgets allow.

Figure 1. Total number of bighorn sheep observed during pre-season classification surveys of the Devil's Canyon herd unit, 2007-2012.



Management Summary. In 2012, hunting season guidelines were drafted for this herd, but not officially adopted by the Department or Commission (Table 1). Guidelines were developed based upon harvest management plans from other states. Many states base the number of hunting licenses for a given year upon the number of mature rams (≥ ¾ curl) observed during the previous year's annual survey. Some states also include criteria for population size and ram:ewe ratios. As another management consideration, Montana Fish, Wildlife & Parks considers amount of time since a population was transplanted into a new area. They do not allow hunting until 10 (or more) years following transplant operations to allow the population to increase and stabilize. The Devil's Canyon herd was originally started in 1973 with supplemental transplants in 2004 and 2006. Two rams harvested within the past 2 hunting seasons (2011, 2012), were released into the area during 2004 and 2006 transplant efforts. It was hoped that transplanted sheep would increase the genetic diversity of this population. Removing those rams (6 years old and 9 years old) limited their contribution to the genetic makeup of this population. If transplanted rams represent the best "trophies" observed by hunters, we should be trying to limit hunting of transplanted rams until those trophy characteristics can be passed along to future generations. More licenses will mean more hunting pressure on those rams that were released into the population.

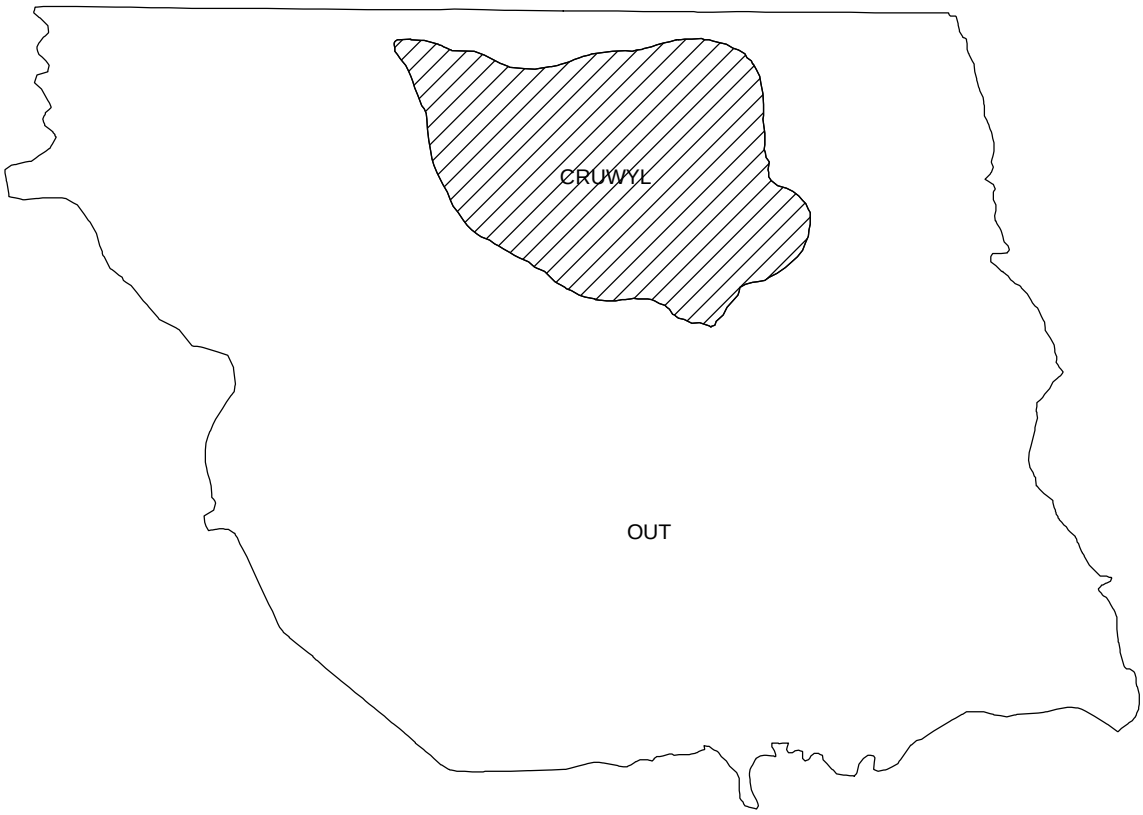
Table 1. Guidelines for managing hunting of rams in the Devil's Canyon bighorn sheep herd.

When the herd has:			**Hunting season structure:**	**Number of Ram licenses is:**
Population size	Rams:100 ewes	% of rams ≥ ¾ curl		
> 10% below objective	< 40:100	< 30	Restrictive	Up to **10%** of ≥¾ curl rams
± 10% of objective	40-60:100	≥ 30	Standard	Up to **15%** of ≥¾ curl rams
> 10% above objective	>60:100	≥ 30	Liberal	Up to **20%** of ≥¾ curl rams

Using the above criteria and 2012 survey data (see above), the restrictive hunting season structure would be recommended; one license. Using data from the 2011 classification survey (143 total sheep, 59 rams:100 ewes, and 49% of rams were ≥ ¾ curl), the standard season structure would be recommended (three licenses.)

The landowners that controls access to this area do not wish to deal with more than two bighorn sheep hunters each year. They feel that more hunters would result in conflicts between hunters since these rams are highly visible and apparently not "afraid" of human activity (too vulnerable). Relations with the landowner were strained at one point, so efforts are still being made to repair that relationship and compromise on license numbers. In keeping with the landowner's desires and using the 2012 survey data, we proposed two licenses for the 2013 hunting season (one resident, one nonresident).

As the population increases, the landowners will realize more benefits (access fee) and may want to control the population more to minimize use of irrigated pastures. At that time, more ram licenses could be issued. This herd will be used as source herd for future transplants to new areas to assist with population control.



Bighorn Sheep (BS212) - Devil's Canyon
HA12